BOTANICAL BEACHCOMBERS AND EXPLORERS:

Pioneers of the 19th Century In the Upper Great Lakes

Edward G. Voss

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This volume of the Herbarium *Contributions* is published just as Rogers McVaugh begins his retirement furlough at The University of Michigan, and on this occasion is appropriately dedicated in his honor.

PREFACE

This excursion into history is a revised and expanded version, with considerable documentation added, of a talk presented at Michigan State University on August 23, 1977, at the 28th Annual Meeting of the American Institute of Biological Sciences (AIBS), as a special lecture arranged by the Historical Section of the Botanical Society of America, additionally sponsored by the Ecological and Systematic Sections of that Society and by the American Society of Plant Taxonomists. An earlier version of chapters 1 and 2 was presented in Bay View at the annual meeting of the Little Traverse Regional Historical Society July 9, 1969. The subject deals principally with traveling and local collectors and observers of plants in the Great Lakes basin above Lake Erie–not with the development of all botany in the region; little or nothing is said about the growth of teaching or of investigations into such fields as plant anatomy and physiology or about the beginnings of forestry and agriculture. Botany as a science was new enough in the 19th century, and it began largely as a study of the flora. Some notice is taken here of early interest in medicinal plants, for these were often native wild species; a large chapter could be developed on this theme alone.

What kinds of people provided our first knowledge about the plants in this previously unexplored territory? This account attempts to put some flesh on them, to tell something of the persons whose names might otherwise be quite meaningless on an old herbarium label or in the literature. Or sometimes a person is well known, but his botanical activities in this region are not. My effort has been to synthesize in a single more or less connected narrative, and to supplement where desirable (and possible), the fragments of botanical history in our region which have been published over the past 160 years. The result, I hope, is a readable story, placed to some degree in historical perspective. The vignettes of botanical history may serve to remind the present generation of local naturalists that the pioneer days were scarcely more than a century ago; and they may serve to remind the historian that there is a rich source of data in the collections and observations of both amateur and professional naturalists.

The wedding of history and natural history should lead to vigorous progeny. I have tried to provide enough dates and facts about the lives of many persons so that specimen labels or published observations, especially if scanty or incomplete, can be more precisely interpreted–or at least to provide an indication of available sources for such information. But sometimes all I have been able to do with the time and resources available is to offer some clues for persons who have defied more ample biographical treatment. Biohistorians who want to go further with certain individuals or certain local areas will find many implicit suggestions for such research, which is likely to be based on both published and unpublished sources, including collections from which itineraries can be reconstructed and from which much can be learned about the flora of an area in times past.

While preparing this account, I have spent weeks reading countless biographical sketches and obituaries. This has been not so much a morbid occupation as one which brings to life the pioneers of past generations. (Although resolving discrepancies between different accounts has often been a real challenge; the numerous errors in dates and other hard facts cited by scholars are distressing to deal with.) The various editions of *American Men of Science* provide some biographical data for the better known botanists and are seldom specifically cited here. Helpful references about early literature and its authors are in Meisel (1924–1929) and Blake and Atwood (1942). The indispensible bibliographic resource for biographical data is Barnhart's *Notes* (1965); in citing biographical references, I have tried to avoid excessive repetition of those easily found in Barnhart and to cite additional ones as well as the best sources for persons whose principal botanical activity was in this region. I have frequently favored accessible secondary sources on historical subjects, for these will refer the reader who wants to go further to earlier works and unpublished material.

I am indebted to a large number of persons and institutions who have nurtured my interests in botanical history over the past quarter-century, especially the late Professor H. H. Bartlett, of the University of Michigan; Rogers McVaugh, Harley Harris Bartlett Professor of Botany, my colleague and mentor in the University Herbarium; Professor Ronald L. Stuckey, of Ohio State University, secretary of the Historical Section of the Botanical Society of America and the instigator for my

drawing this survey together as well as the supplier of much valuable data over the years; and the Michigan Historical Collections/Bentley Historical Library, University of Michigan. The resources of numerous units in the University Library system and of the Alumni Records Office have been essential. The library of Michigan State University (East Lansing) and the Michigan State Library (Lansing) have also been consulted. With a single duly noted exception, every reference cited in footnotes or bibliography has been seen by me. Numerous persons and agencies have responded patiently to inquiries which often must have seemed to them to be trivial.

The first draft of this account was completed at the University of Michigan Biological Station on Douglas Lake, where my students over the years have repeatedly heard about Thomas Nuttall and Douglass Houghton, have seen in the field the species they brought back as new from the upper Lakes long ago, and have sometimes even been kind enough to suggest that the story ought to be brought together and put down on paper.

E. G. V.

March 1978

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All portraits not otherwise credited in their legends are from the files of the University of Michigan Herbarium. The sketch on the cover is from the title page of Agassiz's *Lake Superior* (1850).

INTRODUCTION

The fascinating story of early knowledge about the plant life of the upper Great Lakes has never been presented in any comprehensive way. It is a tale full of historical associations and marked by an unusual number of personal relationships tying together many of the major participants. In these days of fragmented science and intense specialization, it is sometimes hard to comprehend the breadth of knowledge and interests possessed by the explorers and naturalists of the previous century and the influence one had upon another.

No justification is needed for restricting the subject to the 19th century. On the one hand, omission of the 20th century removes from our survey the multitudinous activities of more modern times; and it removes the necessity of referring—or not referring—to any botanists among those now living. On the other hand, omission of the centuries before the 19th really omits almost nothing. Before our story begins seriously in 1810, travelers into this portion of the Old Northwest were more interested in furs, or in the souls of the Indians, than they were in study of the natural history of the region.

What may be the first plant collection from the upper Lakes region recorded as entering the scientific world is cited in a letter from Dr. Alexander Garden, of Charles Town, South Carolina, to British merchant John Ellis, February 2, 1767: "I have given the doctor [Andrew Turnbull] two large pods of a plant which I had from New York, called there the Horn plant, from the shape of the pods. It comes from Detroit. I have never seen it grow, and do not know what it is, if you know, pray inform me?" Four months later, Garden wrote Ellis: "I sowed the Horn plant . . . which is now in flower, but I have not examined it. It seems to approach to the *Chelone* or *Martynia*."[1]

In the latter part of the 17th century and on into the 18th century, missionaries and military men did occasionally record something of the plants of "New France," and a studious individual may even have gathered specimens, although these were more likely for herbal interest than for pure scientific purposes.[2] Jacques Pierre Daneau, Sieur de Muy (1695–1758), who later was one of Cadillac's successors at Detroit, earlier commanded Fort St. Joseph [Niles, Michigan] "and while at that post made a close study of the plants found in that country, and upon his return to France in 1736 carried with him a great collection of specimens to be examined and analyzed in order to determine their medicinal properties."[3] Charles, Marquis de Beauharnois, governor-general of New France, wrote from Quebec on October 17, 1736, that the Sieur de Muy had "devoted himself to the study of plants" and "brought some back powdered,

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[1]James Edward Smith, *A Selection of the Correspondence of Linnaeus and Other Naturalists* (London, 1821) 1: 553–555. See also Edmund Berkeley & Dorothy Smith Berkeley, *Alexander Garden of Charles Town* (Chapel Hill, 1969), p. 215. I offer no opinion as to what the "Horn plant" from Detroit really was; it is not impossible that the unicorn-plant, *Martynia [Proboscidea] louisianica*, was cultivated (and perhaps escaped) in Detroit by 1767. Farwell reported it as rare in waste places there in 1900 (*Rep. Mich. Acad.* 2 (for 1900): 63. 1902 ["1901"]).

[2]See Goodrich (1940, pp. 301–302).

[3]C. M. Burton in *Mich. Pioneer Hist. Coll.* 34: 334–335 (1905).

and some roots and leaves. He states that he has cured a number of savages of various diseases. I think many of these plants are unknown in France."[4] Indeed, some of the plants around the Great Lakes were unknown to science—and many more of them unknown in France—but it was to be another century before naturalist-explorers had made them at all well known.

Most if not all botanical interest in our area before 1810 was even more casual than that of the Sieur de Muy. Cadillac, founder of Detroit, wrote as early as October 5, 1701—only six weeks after his arrival: "The woods are of six kinds,—walnut trees, white oaks, red, bastard ash, ivy, white wood trees[5] and cottonwood trees. But these same trees are as straight as arrows, without knots, and almost without branches except near the top, and of enormous size and height."[6] Cadillac's enthusiasm for his new domain led him generally to describe the vegetation in glowing if not always accurate terms.[7]

Charlevoix, the celebrated Jesuit priest, teacher, historian, and explorer, who journeyed to the western Great Lakes in 1721, noted poison-ivy at Detroit and mentioned the importance of ginseng at the St. Joseph River. He dismissed Mackinac Island, however, as "only a barren rock, and scarcely covered with a little moss and herbs."[8] Many travelers, such as Alexander Henry in the 1760's,[9] were interested in maple sugar. The indigenous peoples of the region were of course familiar with many plants long before the 19th century, especially those considered useful to them, and much of their lore was dutifully recorded by later explorers.[10]

This is not the occasion to relate more of the 17th and 18th century events in this historic region: the battles of the fur trade; the battles of the French, the British, and the Indians; the key location of Michilimackinac at the crossroads of all travel on the upper Lakes, for throughout most of the history of this region, the principal mode of transportation was by water. Even long after the simple canoe had been supplanted by more elaborate vessels, and long after the first stage roads and finally railroads penetrated the North late in the 19th century, water remained a favored route for many purposes—as it is to this day for freighters carrying iron ore and other products of mid-America and for ocean-going vessels of many nations which enter the Lakes via the St. Lawrence Seaway.

Remembering the historic background of the region and the almost complete restriction of early knowledge about it to places along the shores, we are prepared to focus on explorations of the 19th century. This account is admittedly biased toward Michigan, partly because of the central—and complete—location of this state in the

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[4]Quoted in *Mich. Pioneer Hist. Coll.* 34: 137 (1905).

[5]The white wood (or *bois blanc* of the French) was not, as might be imagined, the white birch (*Betula papyrifera*), but the basswood or linden (*Tilia americana*). See, for example, Peter Kalm's diary for Oct. 14 and Oct. 21, 1749 (pp. 564 & 586 in vol. 2 of Adolph Benson's English ed. of Kalm's *Travels*).

[6]Quoted in *Mich. Pioneer Hist. Coll.* 33: 111–112 (1904).

[7]See, for example, *Mich. Pioneer Hist. Coll.* 33: 113–136 (1904) and Goodrich (1940, ch. 2–4).

[8]Quoted from vol. 2, p. 34, of the 1766 English ed. published in Dublin by John Exshaw and James Potts.

[9]Alexander Henry, *Travels and Adventures in Canada and the Indian Territories Between the Years 1760 and 1776* (New York, 1809). [Reprinted 1966 by University Microfilms, Ann Arbor, as March of America Facsimile Series No. 43.]

[10]See also such works as Richard Asa Yarnell, Aboriginal Relationships Between Culture and Plant Life in the Upper Great Lakes Region, *Anthrop. Pap. Mus. Anthrop. Univ. Mich.* 23. 218 pp. (1964).

region to be considered, and partly because of my greater familiarity with developments (and the literature) in this area. I have made no attempt to cover the south end of Lake Michigan, despite the interest of the Indiana Dunes and the shore around Chicago to southern Wisconsin.[11] Some highlights are given for portions of Wisconsin, Minnesota, and Ontario adjacent to the upper Great Lakes, but it is often hard to separate work done in these portions from that done farther away. The east shore of Lake Huron seems actually to have received relatively little botanical attention in the 19th century.[12] Limitations of time and space still permit mention of only selected pioneers: the ones I find most important, most interesting, most representative, or most neglected in existing biographical sources.

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[11]At least there is precedent for this neglect: Only two paragraphs (on pp. 7–8 & 14) in Donald Culross Peattie's *Flora of the Indiana Dunes* (Field Museum, Chicago, 1930) refer very briefly to work since 1870. Neither H. S. Pepoon, in *An Annotated Flora of the Chicago Area* (Chicago Acad. Sci. 1927), nor Floyd Swink, in *Plants of the Chicago Region* (ed. 2, Morton Arboretum, Lisle, Ill., 1974), offers any historical background.

[12]This judgment can be made on the basis of the text and bibliography in Penhallow (1897).

Dwarf lake iris, *Iris lacustris*, one of the first species to be described as new to science from the upper Great Lakes (see p. 5). This is an endemic species, found nowhere except the Lake Michigan–Lake Huron region. (Photo by E. G. Voss in 1963 near the Straits of Mackinac, where the species was first discovered by Thomas Nuttall in 1810.)

Chapter 1.

EARLIEST SCIENTIFIC EXPLORATION IN THE UPPER GREAT LAKES (MICHIGAN AND WISCONSIN)

Our story begins with the travels of Thomas Nuttall (1786–1859),[13] born in England and apprenticed there to his uncle, a printer. Having taken an interest in botany, he sailed for America in 1808 to seek his fortune. In 1810, Nuttall was sent out on a two-year expedition under the patronage of Professor Benjamin Smith Barton of the University of Pennsylvania, whom he had met promptly upon arriving in Philadelphia from England. Barton, full of ambition to write comprehensively on the flora of North America, recognized in Nuttall an able young botanist "distinguished by his love of science, his integrity, his sobriety, and *innocence* of character." And, it has been suggested, his expendability in the wilds of the Northwest.[14] Barton offered him a salary of eight dollars a month plus expenses and wrote up an explicit contract specifying his duties.

Early on the morning of April 12, 1810, Nuttall—then age 24—left Philadelphia for the eight-day stagecoach ride to Pittsburgh. From there, he walked to Lake Erie, with some back-tracking to fetch baggage, and along the shore to the Huron River—over 400 miles of walking altogether. Learning that the west end of Lake Erie was too swampy for practical hiking, he took a boat to Detroit, then a community of less than 1,000 people, where he arrived on June 26. He explored the Detroit area for a month and came to realize not only the immensity of his intended journey to the interior plains of the continent but also the greater feasibility of travel in this region by water than by land. Consequently, he doubtless welcomed an opportunity to depart from his instructions to go from Detroit to Chicago, thence along the western shore of Lake Michigan and overland to Lake Superior and westward. Instead, as he recorded in his diary, he left Detroit on July 29 in a birchbark canoe with the deputy surveyor of the territory of Michigan, Aaron Greely, who was bound for Mackinac Island to survey the town lots and various private claims in the region which antedated American independence.[15] They arrived at Mackinac August 12 and after several days Nuttall was again fortunate in being able to join a party of the Pacific Fur Company headed for the Columbia River via St. Louis. His travel with the Astorians took him to Green Bay for two weeks, where he was impressed with the Indian use of maple sugar and

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[13]A full-scale biography of Nuttall is by Graustein (1967; see pp. 38–77 for his 1810–1811 travels). An earlier account is by Pennell (1936). Nuttall's previously unpublished diary for 1810 was presented by Graustein (1951). For a full bibliography on Nuttall, see Stuckey (1968). Only a brief summary of his life is given here, for the details are now readily accessible and nothing original can be added.

[14]Graustein (1967, p. 50).

[15]On the importance of Greely's surveys in the new territory of Michigan, see M. M. Quaife, Detroit Biographies: Aaron Greeley, *Burton Hist. Coll. Leafl.* 5: 49–64 (1927). He also surveyed the only private claim in Cheboygan County in 1810 and his description (with his name spelled "Greely") is reproduced in Judy Ranville & Nancy Campbell, *Memories of Mackinaw* (Mackinaw City Public Library & Woman's Club, 1976) p. 25.

wild-rice, and thence up the Fox River and by a short portage to the Wisconsin River and the Mississippi. Returning eventually to New Orleans from his western travels, Nuttall shipped his specimens and notes to Barton and sailed for his home in England in December of 1811.

In 1815, the War of 1812 having just been concluded, Nuttall returned to Philadelphia. Three years later, he published *The Genera of North American Plants, and a Catalogue of the Species, to the Year 1817.* This strictly American production achieved international acclaim for Nuttall and was a remarkable accomplishment for one who had spent scarcely more than six years in this country. According to tradition, he set much of the type himself.[16]

There are no entries in Nuttall's diary between his departure from Detroit July 29, 1810, and his arrival in Wisconsin on August 26. But we know from his *Genera* that his days on the Lakes were profitable. Altogether, Nuttall mentioned about 60 species as specifically occurring around the Great Lakes, at least a third of them described as new to science, including *Amorpha canescens* (leadplant) from the Fox River of Wisconsin and westward, *Orchis huronensis* (= *Habenaria hyperborea,* tall northern green orchid) from islands of Lakes Michigan and Huron, *Melanthium glaucum* (= *Zigadenus,* white camas) from a number of localities, and others. Chief among these were three species described as new to science from the vicinity of Michilimackinac: *Iris lacustris,* a dwarf species named for the lakes and endemic to the shores of northern Lakes Michigan and Huron; *Tanacetum huronense,* a large-headed tansy named for Lake Huron but in addition to the sandy shores of the northern Great Lakes now known also from the Hudson Bay region and the north Atlantic and Pacific coasts; and *Rubus parviflorus,* a misnomer regarding flower size, the tasty thimbleberry in fruit, occurring in the northern Great Lakes region, the Black Hills of South Dakota, and quite widely in the West—a classic example of the disjunct cordilleran or western element in our flora.

The species we know now as *Lathyrus japonicus* (or *L. maritimus,* the beach pea) and *Cakile edentula* (sea rocket) were among the common beach plants Nuttall noted but which, unlike the tansy, had already been described from ocean shores. He also mentioned the little birdseye primrose, *Primula mistassinica* (which he called *P. farinosa*), from the "calcareous gravelly shores of the islands of Lake Huron; around Michilimakinak, Bois Blanc, and St. Helena, in the outlet of Lake Michigan," admitting he had not seen it in flower; *Linnaea borealis* (twinflower), "abundant in the shady pine forests of Lake Huron"; *Polygala paucifolia* (fringed polygala), forming "almost exclusive carpets of great extent in the Pine forests of Lake Huron"; and many others which likewise were not new to science but which make clear that Thomas Nuttall deserves credit as being the first botanist to have seen and recognized in his published work many of the most distinctive plants of our northern forests and shores. His collections would be the first scientific ones from this region, but most of them were apparently lost.[17] His travels never brought him to the Great Lakes region again after 1810.

In 1818, the year that Nuttall's *Genera* was published, Illinois was admitted to the Union and Michigan Territory was extended to include the land north of Illinois and west of Lake Michigan as far as the Mississippi River—in other words, to include what

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[16]See the useful "Editor's Introduction" by Joseph Ewan in the 1971 Hafner reprint of Nuttall's *Genera.*

[17]Stuckey (1967).

later became Wisconsin and much of Minnesota. Since 1813, Lewis Cass had been governor of Michigan Territory, which had been separated from Indiana in 1805, and he became increasingly anxious to learn about this large area and make peace with the Indians, some of whom still bore friendly feelings toward the British after the War of 1812. Born in New Hampshire in 1782 and raised in Ohio, Cass came to Detroit with the Ohio militia at the beginning of the War of 1812. He considered General Hull, then governor of the territory, to be a traitor for surrendering Detroit and testified at his subsequent court-martial. President Madison soon named Cass governor and henceforth he was regarded as a Michigan man; he maintained his home in Detroit—the territorial capital—throughout his years of government service.[18] It was Cass always recognized as a scholar in his views—who led the first government-sponsored, scientifically oriented expedition into the upper Great Lakes.[19]

On November 18, 1819, Governor Cass wrote to Secretary of War John C. Calhoun, suggesting an expedition to the Lake Superior–Upper Mississippi region, which would "well accord with that zeal for inquiries of this nature which has recently marked the administration of the War Department." He pointed out: "The country upon the southern shore of Lake Superior, and upon the water communication between that lake and the Mississippi, has been but little explored, and its natural features are imperfectly known. We have no correct topographical delineation of it,

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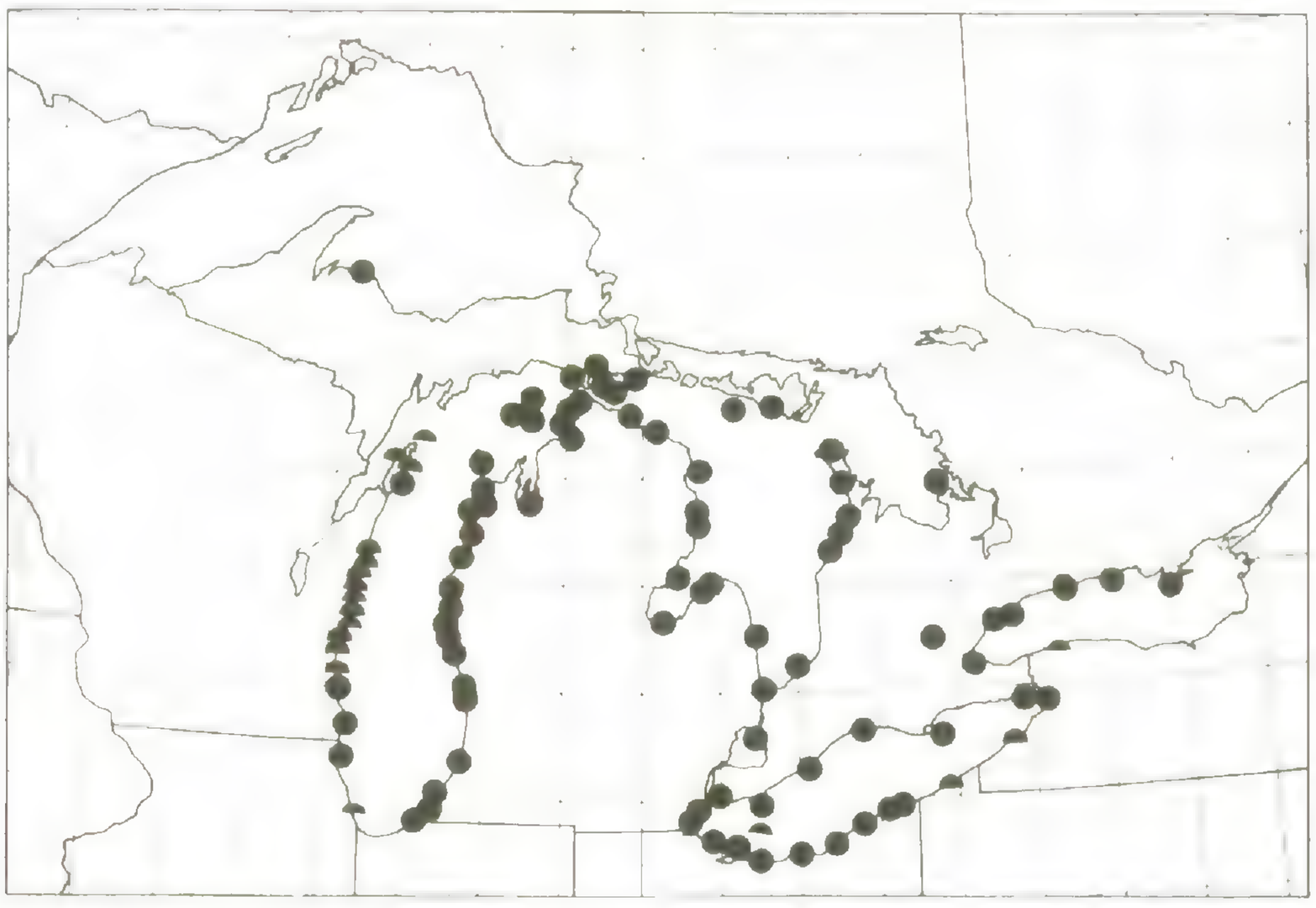
[18]For a recent biography of Lewis Cass, see Dunbar (1970). Following 18 years as governor of Michigan Territory, Cass served as secretary of war, minister to France, U.S. senator from Michigan, and secretary of state. It was he who wrote the state motto of Michigan, *Si quaeris peninsulam amoenam, circumspice*; and he designed the state seal. Cass' presidential ambitions were never fulfilled, but he was the nominee of the Democratic Party in 1848; not until 1976 was another Michigan man nominated for the presidency by a major party (the other party, but with equal success).

[19]The most complete account of this expedition is in the thoroughly documented edition of Schoolcraft's *Narrative* by Williams (1953). Brief summaries are in Meisel (1926, 2: 400–404) and Rodgers (1942, pp. 63–66).



Distribution of sea rocket, *Cakile edentula*, in the Great Lakes region - typical of the species restricted to the shores of this region but which also occur on ocean shores. (From Guire & Voss 1963, p. 107; half circles represent reliable reports; full circles represent specimens examined.)

and the little information we possess relating to it has been derived from the reports of the Indian traders." Cass concluded: "I am not competent to speculate upon the natural history of the country through which we may pass. Should this object be deemed important, I request that some person acquainted with zoology, botany, and mineralogy may be sent to join me."[20] There were reports of copper to investigate and treaties to be concluded with the Indians for certain of their lands; some understanding of what the British might be doing and what influence they still had on the Indians would be useful to the Government.

Calhoun was convinced of the merits of the proposed expedition and on January 14, 1820, directed Cass to proceed with the plans which, in fact, he had already begun to implement. In February, Calhoun appointed Henry Rowe Schoolcraft, then age 27, to the position of mineralogist of the expedition. His salary was $1.50 per day.[21] Schoolcraft had learned the glass industry in his youth in New York state and in 1819 published an account of the lead mines of Missouri, which brought him to the attention of Calhoun. It was his appointment to the Cass expedition which first brought Schoolcraft to his adopted state of Michigan, where Cass had him appointed in 1822 as Indian agent at Sault Ste. Marie, where he served until the agency was combined in 1832 with the one at Mackinac, where he continued until 1841.

Captain David Bates Douglass (1790–1849),[22] an 1813 Yale graduate and since 1815 assistant professor of natural philosophy in the U.S. Military Academy at West Point, was appointed to prepare a map and serve as scientist to the expedition in all fields except those assigned to Schoolcraft. As Cass wrote him: "The astronomical & topographical observations will of course be made by you, and the departments of zoology & botany will require as much of your observation as you may be able to bestow upon them."[23] As the first person assigned by the Federal government to collect plants around the northern Great Lakes, Douglass should rate a prominent place in our history, but his specimens are not numerous. He reported after the expedition: "The region in which the greater part of our journey has been performed is not one which presents any considerable variety of Botanical specimens. I have however formed an Herbarium of such as offered."[24] Douglass' heart seems not to have been in botany! John Torrey of New York, the leading botanist in the country, had sent him instructions on making specimens before the trip, but as Douglass wrote afterwards to Benjamin Silliman (his former professor at Yale): "I must beg leave to observe, in the first place that the collection of plants was made by a person, who, besides not being a professed botanist, was almost constantly engaged with other objects of research. The formation of an Herbarium, requiring much leisure and frequent attention, could scarcely be expected, under such circumstances, and would not have been undertaken, except in the exigency of having no professed botanist attached to the Expedition."[25]

The specimens were sent to Torrey, who published an account in volume 4 of Silliman's *American Journal of Science and Arts* (1821). I have encountered some of

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[20]Quoted by Schoolcraft (1855, pp. 27–31); Williams (1953, pp. 302–305); Jackman et al. (1969, pp. 114–117).

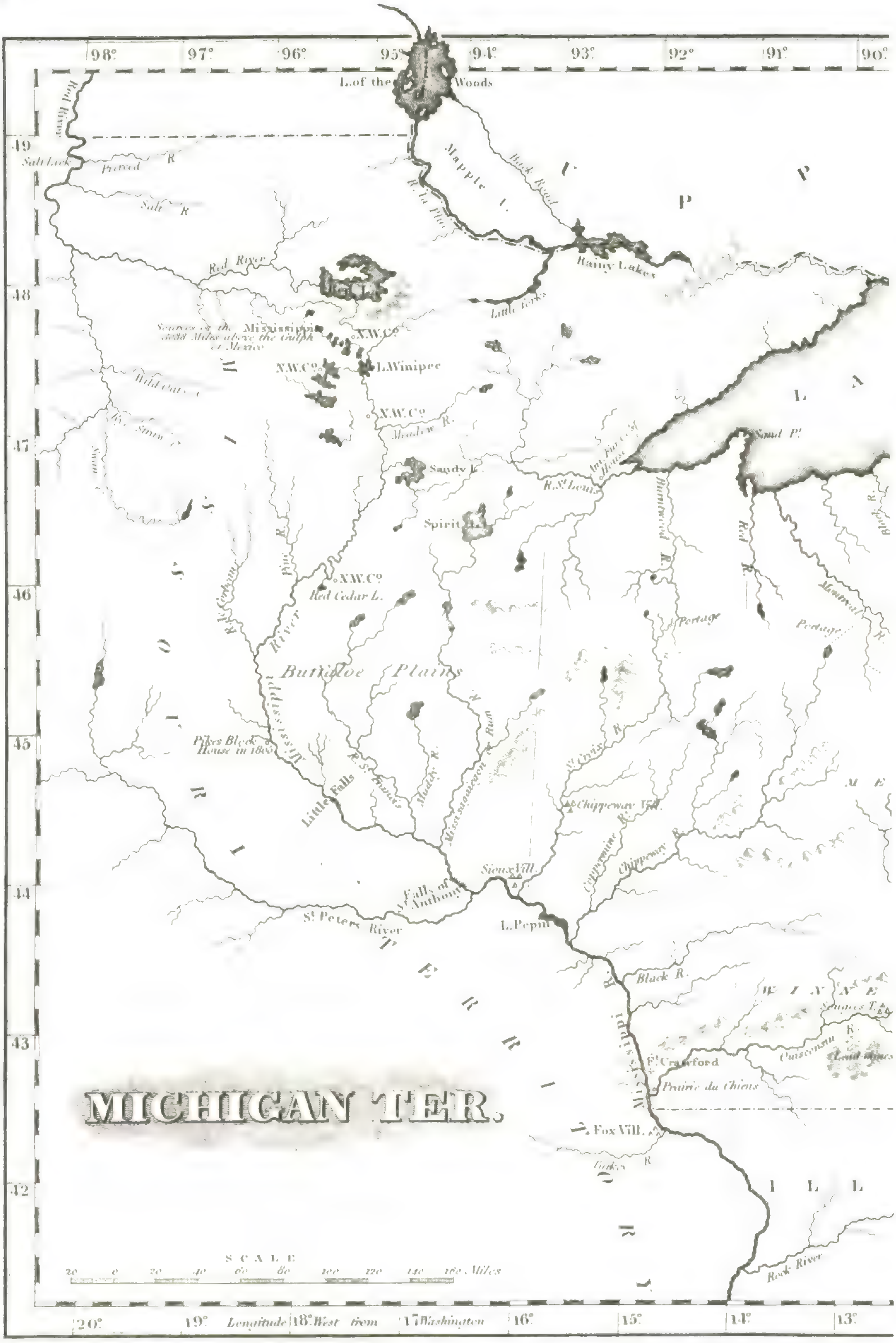
[21]W. W. Folwell, *History of Minnesota* (Minn. Hist. Soc., 1921), 1: 102.

[22]On David Bates Douglass, see Stuart (1871, pp. 199–221); Dexter (1912, pp. 550–553); Jackman et al. (1969, pp. xiv–xxii).

[23]Quoted by Williams (1953, p. 311).

[24]Quoted by Williams (1953, pp. 385–386); Jackman et al. (1969, pp. 120–121).

[25]Quoted in Torrey (1821, p. 57); Rodgers (1942, p. 65); Williams (1953, p. 395).



Michigan Territory as mapped in 1823 by Fielding Lucas, Jr. (slightly reduced). (Original in Map Collection, Harlan Hatcher Library, University of Michigan.)

89°
88°
87°
86°
85° Longitude West from
84° Greenwich
83°
82°
81°
49
48
47
46
45
44
43
42
12°
11°
10°
9°
8°
7°
6°
5°
I. Royal
I. Philipeaux
Manitou I.
Michipicoten House
Caribou I.
Portage
NWCo
L. George
St Marys Falls
Portage
Portage
Portage
Portage
Portage
Natural Rocks
Portage
Portage
Portage
Portage
Portage

Douglass' specimens in the herbarium of the New York Botanical Garden, where Torrey's collections now reside; they are very scantily labeled. A few others, sent by Torrey to Schweinitz, are in the herbarium of the Academy of Natural Sciences, Philadelphia.[26] Schoolcraft published a narrative of the expedition in 1821, organized chronologically, with dates; and Douglass' journal was published recently, though with careless and often erroneous botanical annotations.[27] Since there are dates with some species in the Torrey list, it is sometimes possible to connect a specific locality to a certain plant, especially if the label bears a date. Observations on the flora and general vegetation occur throughout the accounts of Schoolcraft and Douglass.

Schoolcraft and Douglass arrived in Detroit at midnight on May 8, on the first run of the season from Buffalo of the famous steamship, *Walk-in-the-Water.* (At Buffalo, Douglass apparently collected the type material of the spring cress which bears his name: *Cardamine douglassii* Britton.) Much work needed to be done to prepare for departure; the supplies needed for a summer in the wilderness amounted to several tons, for there were 40 or more persons in the party, including soldiers, Indians, and voyageurs. On May 24 the group departed from Detroit in three birchbark canoes made by Saginaw Indians. These were not little recreational canoes: they were 30 or more feet long and capable of carrying about four tons each. But they were not the safest vehicles for keeping specimens dry! As quoted in a letter from Douglass to Silliman, accompanying Torrey's list of the plants, "a part of the collection was injured by an accident on the Ouisconsin, in which my canoe was very nearly filled with water before it could be got ashore. The consequence of which was that nearly all the plants in one case were completely spoiled before I was able to dry them."[28]

The expedition returned to Detroit, with all personnel safe and sound after more than 4,000 miles of travel, almost four months after leaving. It took 14 days to travel from Detroit to Mackinac. Every night they put ashore and unloaded all the tons of cargo. There were apparently a few moments for botanizing, as a number of species are mentioned in the Torrey list for the shores of Lake Huron. Some, such as the yellow lady-slipper, *Cypripedium calceolus,* listed for "Presque Isle, June 5th," bear dates when Schoolcraft's narrative and the journals of others note that the party was detained by strong winds. The expedition stayed six days at Mackinac Island, getting an additional canoe, laying in supplies, and making observations. Here they noted the dwarf *Iris lacustris,* with the comment in Torrey's catalog: "Mr. Nuttall discovered this

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[26]Rodgers (1942, p. 65); Stuckey (1978a).

[27]Jackman et al. (1969); extracts were earlier published by Williams (1953, App. E, pp. 366–382). Other journals of the expedition were also kept. James Duane Doty, 20-year-old Detroit lawyer, was appointed official journalist. His journal was finally published in *Coll. State Hist. Soc. Wis.* 13: 163–246 (1895) and by Williams (1953, App. F, pp. 403–436). Doty was later the second governor of Wisconsin Territory (1841–1844); he had been active in promoting Wisconsin as a territory and in getting Madison as the capital. His colorful and controversial political career does not concern us here; it is concisely summarized by Joseph Schafer in *Wis. Mag. Hist.* 18: 446–465 (1935). A full treatment of Doty is by Alice Elizabeth Smith, *James Duane Doty Frontier Promoter* (State Hist. Soc. Wis., Madison, 1954. 472 pp.). Charles C. Trowbridge, likewise 20 and living with Doty in Detroit, was employed as an assistant to Douglass. His journal was published in *Minn. Hist.* 23: 126–148; 233–252; 328–348 (1942) and by Williams (1953, App. G, pp. 462–498). Trowbridge became a prominent citizen of Detroit, which he saw grow to a large city before his death in 1883; he served in many charitable, business, and civic capacities, including mayor. In 1836 he was the unsuccessful Whig candidate for governor of the new state, losing to Stevens T. Mason, who at the age of 19 had become acting governor upon Cass' removal to Washington in 1831 to become secretary of war. Trowbridge was the first secretary of the University of Michigan, 1837–1838.

[28]Quoted also by Williams (1953, p. 395).

Iris in the same place where it was found by Capt. Douglass–on the gravelly shores of the Islands of Lake Huron." Traveling two years after the publication of Nuttall's *Genera* (in which this iris was first described) and 18 years after Nuttall's trip, the Cass expedition had one botanical advantage in its earlier season, so that some species, such as the endemic dwarf iris, might still be seen in flower. Similarly, of the little primrose found by Douglass on the shores of Lake Huron, Torrey says: "Mr. Nuttall found it in the same place, but not in flower." The journey from Mackinac to the "Soo" took two days, and three were spent dealing with the Indians there, including a treaty ceding to the United States 16 square miles of land and making possible the establishment of Fort Brady–now the site of Lake Superior State College.

Over two weeks were spent along the south shore of Lake Superior, including two days passing the Grand Sable Dunes and the Pictured Rocks, both of which features greatly impressed the travelers–and nearly 150 years later sufficiently impressed Congress to establish for them the Pictured Rocks National Lakeshore. Dr. Alexander Wolcott, Indian agent at Chicago and physician to the expedition, "with considerable labour ascended these sandy eminences," wrote Schoolcraft of the dunes.[29] Another member of the party wrote: "one of our Indians whom curiosity induced to ascend them had much the appearance of a child when running on the summit of the hills, and when he returned to the canoe he was almost exhausted with fatigue."[30] Douglass expressed the general sentiment regarding the next landmark: "I cannot think any scenery I ever visited, even including Niagara Falls and its vicinity, is to be compared for grandeur and sublimity to the Pictured Rocks of Lake Superior."[31] Governor Cass, duly impressed with his first view of this part of his domain, wrote to Secretary of War Calhoun: "Two of the most sublime natural objects in the United States, the Grand Sable, and the pictured rocks are to be found upon this coast. The former is an immense hill of sand extending for some miles along the Lake, of great elevation & precipitous ascent. The latter is an unbroken wall of rocks, rising perpendicularly from the Lake to the height of 300 feet assuming every grotesque & fanciful appearance, and presenting to the eye of the passenger a spectacle as tremendous as the imagination can conceive, or the reason itself can well sustain."[32] Apparently the members of the expedition were too overcome by the scenery to collect any specimens from this area, but later explorers made up for their neglect.

Near the Keweenaw Peninsula, Schoolcraft commented: "we here first noticed a creeping plant called *kinni-kinick* by the Indians, which is used as a substitute for tobacco. . . . The Indians prepare it by drying the leaf over a moderate fire, and bruising it between the fingers so that it, in some degree, resembles cut tobacco. In this state it is smoked, and is very mild and pleasant."[33] We know the plant as bearberry (*Arctostaphylos uva-ursi*), and Torrey's catalog of Douglass' collections also refers to smoking it. Late in June the expedition crossed the Keweenaw Peninsula including its boggy portage where a ship canal was under construction 50 years later. Douglass noted several bog plants here including pitcherplant (*Sarracenia purpurea*) and the showy lady-slipper (*Cypripedium reginae*). The ubiquitous false toadflax (*Comandra*

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[29]Schoolcraft (1821, p. 148).

[30]James Doty's journal for June 20; see Williams (1953, p. 471).

[31]Jackman et al. (1969, p. 49).

[32]Quoted by Williams (1953, p. 325).

[33]Schoolcraft (1821, pp. 161–162)..

umbellata) was noted at Keweenaw and said to be "Used by the Indians and traders in fevers."[34]

How did this official Government expedition celebrate the Fourth of July, 1820 the 44th anniversary of American independence? There was an unfavorable wind, and until 2:00 they stayed on land at the mouth of the Sandy River, on the Wisconsin shore of Lake Superior. The only collection of Douglass' listed by Torrey for this date is the beach pea (*Lathyrus japonicus*), which is known not only from all five of the Great Lakes but also Lake Champlain, Lake Winnipeg, and the northern shores of the Atlantic and Pacific - as well as the Old World. Strictly a shoreline plant, it is representative of a group of species that would naturally be seen by explorers traveling by water, but that no one would find inland.[35] Nuttall had said it was "Abundant on the shores of Lakes Erie, Huron and Michigan." On July 5, the expedition reached Fond du Lac - the present site of Duluth and prepared to go up the St. Louis River and across to the Mississippi. They never did reach the source of the Father of Waters, for it was too late in the season for navigating the rivers. But they arrived at Upper Red Cedar Lake, later renamed Cass Lake, and then returned downstream to the Wisconsin River, whence they portaged to the Fox River, reaching Green Bay on August 20. Wild-rice was found "in the greatest luxuriance and plenty in Fox river" and another grass was described as new by Torrey from "the banks of Fox River, &c" (*Panicum longisetum*, now considered a form of *Echinochloa walteri*, one of the wild millets). Some of the party returned to Detroit directly from Green Bay, while the rest continued down the west side of Lake Michigan to Chicago; Governor Cass went from there overland to Detroit, leaving Schoolcraft and Douglass to continue around the east side of Lake Michigan, back to Mackinac, and down to Detroit, which they reached on September 23 - one day short of four months after their departure.

Although explorations by canoe were rugged adventures, we should remember that conditions even in the territorial capital at the time were primitive by modern standards: In 1820, Detroit (population about 1,500) had steamboat service from Buffalo once every two weeks or so (except of course in winter)—but there was no railroad, no telegraph or telephone, no stagecoach service, no daily newspaper (though there was a weekly one), and no daily mail (in 1817 the mail began to come fairly regularly from Washington via Cleveland once every three weeks, by horse and rider[36]).

It is now time for a brief digression on medical men. Many early physicians were, of course, also accomplished botanists. These included some Army surgeons, one of whom was Zina Pitcher (1797–1872).[37] A native of New York state, Pitcher graduated in medicine from Middlebury College, in Vermont, in 1822. This was during the period (1817–1824) that Amos Eaton, who was to become famous as a scientist

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[34]Torrey (1821, p. 60).

[35]See Guire & Voss (1963). Because of their restricted distribution, several such species are considered "threatened," including the *Iris* and the *Tanacetum* described by Nuttall (see *Mich. Bot.* 16: 104 & 106. 1977).

[36]Farmer (1890, p. 880).

[37]On Zina Pitcher, see *Natl. Cycl. Am. Biogr.* 12: 214–215 (1904); Kelly (1914, pp. 145–150); Connor in Kelley & Burrage (1920, pp. 917–918); Phalen in *Dict. Am. Biogr.* 14: 636–637 (1934); Bidlack (1962, pp. 12–14); Whittaker (1972). There is a tribute in the middle of the front page of the Detroit *Free Press* for April 6, 1872, the day after Pitcher's death: "Death of Dr. Zina Pitcher. A Good Man Gone to His Rest."

Dr. Zina Pitcher (1797–1872). (Undated and unsigned portrait presented to the University of Michigan in 1915 and currently in the care of the Medical School.)

and educator, "wandered through the New England states and New York"[38] lecturing on botany. Through such lectures, Eaton became Pitcher's instructor in botany.[39] For the first eight years after receiving his M.D., Pitcher was stationed as an Army surgeon "in the yet unbroken wilderness of the territory of Michigan."[40] He served at Fort Saginaw, Fort Brady (Sault Ste. Marie) from 1826 to 1828, and Fort Gratiot (Port

[38]McAllister (1941, p. 180). The Rensselaer School, with which Eaton's name is so closely associated, was not founded until 1824; Pitcher could not have studied with Eaton there, as suggested in some biographies.

[39]Eaton, America's "first great teacher of natural history," had also been Torrey's first instructor in botany, when young Torrey's father was fiscal agent for the prison in which Eaton was incarcerated on questionable charges of forgery (Rodgers 1942, pp. 13–16). One of Eaton's sons, it might be noted here, Amos Beebe Eaton (1806–1877), was a military man who did some collecting in the Great Lakes region; he was stationed for a while at Fort Gratiot, where his son, Daniel Cady Eaton, was born in 1834. But D. C. Eaton's botanical activity came after he left Michigan. (See Setchell 1900; Stuckey 1978c.)

[40]Kelly (1914, p. 146).

Huron), before going to Arkansas and Virginia. He accumulated a large herbarium which was acquired in 1880 by Isaac C. Martindale, whose collection was ultimately purchased by the U.S. Department of Agriculture in 1964 for the National Arboretum.[41] In 1836, nearly 15 years after being commissioned by Secretary of War Calhoun, Pitcher resigned his commission and returned to Michigan, where he practiced medicine in Detroit and became one of the leading citizens of the state.

In 1828, while he was stationed in Michigan, Pitcher had joined with Lewis Cass and Henry Rowe Schoolcraft in founding the Historical Society of Michigan. Upon his return to the state, he was named by Governor Mason–although of the opposing party–to be a member of the first Board of Regents of the University of Michigan. He served as an influential regent until 1852, when the post became elective, and is credited with being the founder of the medical school, on whose faculty he served 1851–1872. When the American Medical Association met in Detroit in 1856, it elected as its 10th president the president of the Michigan State Medical Society and former mayor of Detroit, Dr. Zina Pitcher.

A number of plants have been named for Pitcher, including a handsome thistle with cream-flowered heads, *Cirsium pitcheri*, which grows only on the sandy shores of Lakes Michigan and Huron, with a single area on Lake Superior. It is now considered a "threatened species."[42] Torrey proposed the epithet, based on material found by Pitcher "on the great sand banks of Lake Superior," so it was probably while Pitcher was stationed at Fort Brady that he found this plant; the "great sand banks" can only be the Grand Sable Dunes, so admired by the Cass expedition and to this day the only place on Lake Superior where Pitcher's thistle is known to grow. However, this is not the type locality, thanks to one of those legal maneuvers into which the conventions of nomenclature can lead us. Torrey was not the first to *publish* a name for this thistle, which was actually first described by Amos Eaton in the fifth edition of his *Manual of Botany* (1829), with a clear statement that although it was first found by Pitcher on Lake Superior, "My specimen was collected by Dr. E. James, at Lake Huron, from which I made this description."

Edwin James (1797–1861)[43] graduated from Middlebury College in 1816, six years before Pitcher, and then studied medicine with his older brothers in Albany, New York. Already possessed of an interest in botany, he attended lectures by Eaton in Albany and doubtless elsewhere (including the Troy Lyceum of Natural History). Through Eaton, James became acquainted with John Torrey. While the Cass expedition was exploring the Lake Superior region in 1820, Dr. James was accompanying Major Stephen H. Long's first expedition, to the Rocky Mountains, as botanist and geologist as well as surgeon. After writing up the results of Long's expedition, James applied for formal instatement as assistant surgeon, U.S.A., and this was approved by the Senate in January, 1823. His service was mostly at Fort Crawford (Prairie du Chien) on the upper Mississippi until 1826, when he received orders late in the fall to go to Fort Brady (18th in his list of 20 posts in order of preference!).[44] Knowing that ice would prevent him from reaching his assignment before spring, he went by boat to Albany

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[41]Meyer & Elsasser (1973, pp. 382–383). Torrey sent some Pitcher specimens to Schweinitz, and collections of his are to be found in various herbaria.

[42]See *Mich. Bot.* 16: 106 (1977).

[43]On Edwin James, see Pammel (1907–1908); Rowe in Kelly & Burrage (1920, pp. 606–607); Ewan (1950, pp. 13–20; 237–238); Voss (1956, pp. 24–26); Benson (1968).

[44]Benson (1968, pp. 158–160).

and visited there and in Philadelphia, where he was married. Before navigation opened on the Lakes, he received a change in orders: the assistant surgeon at Fort Mackinac, Dr. Richard Satterlee, was going on leave, and James took his place from May 23 until the end of August,[45] after which he proceeded to his original assignment at Fort Brady, where he remained until the spring of 1832 (thus overlapping for a year Pitcher's assignment to Fort Brady).[46] While at this post, he became a charter member of the Historical Society of Michigan, founded in 1828 with two other citizens of Sault Ste. Marie, Zina Pitcher and H. R. Schoolcraft, as prime movers.

The type specimen of Pitcher's thistle, then, was probably collected by Edwin James during the summer of 1827 at (or near) Mackinac Island, in the north end of Lake Huron. Presumably James collected other plants there and at Fort Brady.[47] In 1832 he was assigned to Albany, New York, and the next year he was dismissed from the Army. He had become interested in Indian dialects while stationed on the frontier, in the temperance movement, in abolitionism, and in other subjects, and spent the last quarter-century of his life in Iowa, ending his days as something of a recluse.

The Cass expedition had never reached the true source of the Mississippi, and Schoolcraft could not forget a hope of achieving that goal—even though he had written from Vernon, New York, to Douglass in November of 1820: "I have scarcely stirred out of the house since my return, and have endeavoured in the comforts of a christian country to forget the *canoes, the rocks,* and *headwinds* of those 'bloody Lakes.'"[48] Settled in Michigan as Indian agent at Sault Ste. Marie in 1822, married in 1823 to Jane Johnston (the well educated daughter of a prominent fur trader and grand-daughter of a Chippewa chief), and member of the territorial legislature 1828–1832, Schoolcraft became increasingly involved in Indian history and in Indian affairs on Lake Superior and in Wisconsin and Minnesota.[49] His opportunity for the long-awaited exploration came late in 1830, when Governor Cass, under directions from the War Department, requested Schoolcraft to endeavor to end the hostilities between the Chippewa and the Sioux in the Minnesota-Wisconsin area, when a negotiated boundary line between the tribes was in no way marked and tension was mounting. Schoolcraft made plans for an expedition the following summer. In addition to a small detachment of troops and the usual Indian guides and such persons, the party included School-craft's brother-in-law, George Johnston,[50] and a physician who was to become extraordinarily prominent in Michigan affairs—Douglass Houghton.

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[45]To place the times in historical perspective, it may be noted that the celebrated surgeon William Beaumont had just left Fort Mackinac two years previous, in 1825.

[46]For dates of James' and Pitcher's assignments, I am indebted to investigations of Rogers McVaugh in the National Archives and reported in a letter to me March 5, 1956. See also the account of James' rivalry with Schoolcraft while at Fort Brady (Benson 1970, from Benson 1968).

[47]Specimens sent by James to others, such as Torrey (whose herbarium is at the New York Botanical Garden), should be preserved, but none of the thistle is in Eaton's herbarium (see Voss 1956) and no material of it collected by James or Pitcher is at the New York Botanical Garden (according to C. W. Laskowski, who searched for me in 1964). James' own collections and papers were burned after the death of his wife in 1854 (Pammel 1908; see also Benson 1968, p. 334).

[48]Quoted by Williams (1953, p. 353).

[49]For a recent discussion of Schoolcraft's role in history, see Marsden (1976).

[50]On the family of George Johnston, brother of Jane Johnston Schoolcraft, grandson of a leading Indian chief in Wisconsin, see *Mich. Hist.* 54: 108–121 (1970).

Chapter 2.
THE HOUGHTON ERA

Douglass Houghton (1809–1845)[51] grew up in New York state and received his A.B. in 1829 from the Rensselaer School in Troy, where he greatly impressed the senior professor, the well known botanist and educator, Amos Eaton. Eaton asked him to remain as an assistant and in February of 1830 he was appointed adjunct to the junior professor in chemistry and natural history, with expectations of a higher position.[52] With a promising career ahead of him, what led Douglass Houghton to Michigan?

In the fall of 1830, Detroit, then a prospering community of some two thousand citizens and the capital of the territory of Michigan, wanted to improve its cultural opportunities. A newspaper and several prominent citizens of the state, including Lewis Cass and Zina Pitcher, supported a proposal to bring a lecturer who would talk on, and demonstrate, science. Amos Eaton had written that someone from his institution could be obtained and when the funds were subscribed, Lucius Lyon, the Michigan territorial delegate in Congress, stopped to visit Eaton on his way home from Washington and closed negotiations. So it was on Eaton's recommendation that young Houghton, less than two months after his 21st birthday, arrived in Detroit, allegedly with 10 cents and a letter of recommendation in his pocket. This was in November of 1830, just before the ice put an end to navigation for the season. His lectures that winter on chemistry, natural history, and mechanical philosophy were an astounding success and Houghton became one of the most popular men in Detroit, acquainted with the leading citizens. These included Schoolcraft, who was then serving in the legislature and who wrote later about plans for his expedition:

> While at Detroit during the winter, I had invited Dr. Douglass Houghton to accompany me to vaccinate the Indians. He was a man of pleasing manners and deportment, small of stature, and of a compact make, and apparently well suited to withstand the fatigues incidental to such a journey. He was a good botanist and geologist objects of interest to me at all times; but especially so now, for I should have considered it inexcusable to conduct an expedition into the Indian country, without collecting data over and above the public duties, to understand its natural history.[53]

The expedition left Sault Ste. Marie by canoe June 25 and returned 72 days later, on September 4, having traveled an estimated 2,300 miles. Houghton collected extensively and sent many plants to John Torrey, with whom he corresponded often. One letter from Houghton to Torrey, dated at Fredonia, New York, March 20, 1832, gives something of the flavor of his work:

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[51] A biography of Houghton, with references to previous accounts, is by Rintala (1954). See also Kelly & Burrage (1920, pp. 564–565); Fuller (1928); Merrill in *Dict. Am. Biogr.* 9: 254–255 (1932); Wallin (1970); and numerous other sketches.

[52] Nason (1887, p. 187). Until 1835, there were only two professors, "senior" (Eaton) and "junior," at the institution, which became "The Rensselaer Institute" in 1832 and "Rensselaer Polytechnic Institute" in 1861.

[53] Schoolcraft (1851, p. 350).

Some time in November last I received, through the hands of H. R. Schoolcraft Esqr. of the Saut Ste Marie, notice that you had made some requests respecting the plants which were collected during the expedition of the past summer. He also informed me that he had written you upon the same subject.

In the expedition referred to I acted as naturalist, and have now the entire collection of plants, as well as parts of the other collections in my possession. You are undoubtedly well aware of the numerous difficulties which are presented in preserving and securing plants during a long and tedious canoe voyage. With the utmost care, I was unable to preserve many of my duplicate specimens, & others were entirely lost, or much injured. I send you a catalogue, as it was first taken, embracing many common plants which were preserved, mostly for comparison with our eastern & more southern plants. The unfortunate loss of my most valuable botanical books, of reference, together with an uncommon pressure of business, has prevented any thing more than a cursory examination of the plants, since my return to this place. At the Saut Ste Marie, by the aid of Dr. James, of the U.S. Army, I was enabled to solve some of my difficulties . . .[54]

Later in the same letter, Houghton mentions that "Eaton's Manual 5th Edition was the work which I used in the field"; and in a letter to Schoolcraft dated April 3, 1832, Houghton stated "as I look for several new botanical works, in a few days, I will have some enjoyment in burying myself among my plants."[55] On May 12 he wrote Schoolcraft that he had spent "several days engaged in preparing to secure what plants may be collected from the effects of water. . . . I have heard from Torrey & have sent him a suit of Plants."[56] There can be no doubt that Houghton was an accomplished botanist in addition to his geological and other abilities. Schoolcraft noted at the Mauvaise [Bad] River in Wisconsin: "In the ascent of this stream, Dr. Houghton has collected about two hundred plants"[57] and later he stated that Houghton "was a zealous botanist, and a discriminating geologist."[58] But he was not immune from the same problems that Nuttall and Douglass had evidently had, of keeping dry specimens from loss and damage on a long canoe voyage.[59]

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[54]The original of this letter is in the Torrey papers at the New York Botanical Garden; a photostat is in the Michigan Historical Collections, University of Michigan, including an appended list of plants found in 1831. This list was dismissed by Mason when quoting the letter (1958, pp. 294–295) as having "little historical value"; Mason stated that the information could be found in Houghton's published list (1834), but this is not true, for the published list makes no distinction between 1831 and 1832 collections. This letter by Houghton presumably resulted from a letter which Schoolcraft received from Torrey early in October of 1831, in which he stated: "You know that I have long devoted much of my time to the study of N. American botany, and that I am collecting materials for a general Flora of our country. Now, my dear sir, if you or Mr. Houghton (the young gentleman whom, I am informed, accompanied you) have made any collections in botany, I should esteem it a peculiar favor to have the examination of the specimens." (Schoolcraft 1851, p. 397) On June 24, 1832, Houghton wrote to his brother Richard: "I received another letter from Prof. Torr[e]y, respecting my plants of last year . . . and I was much gratified to learn that the opinion I had given respecting those which I supposed to be undescribed species was supported by the New York botanist. This will give me fresh courage to push the subject this season." (Quoted by Mason 1958, p. 298).

[55]Quoted by Mason (1958, p. 296) from letter in Schoolcraft papers, Library of Congress.

[56]Quoted by Mason (1958, p. 297) from letter in Schoolcraft papers, Library of Congress.

[57]Schoolcraft (1851, p. 365).

[58]Schoolcraft (1851, p. 429).

[59]Rodgers (1942, p. 103) quotes a letter from Torrey to Schoolcraft, October 5, 1832, omitting after the second paragraph a passage kindly suplied me by R. L. Stuckey: "Dr. H. sent me some of the more interesting plants which he brought with him last year – but he said that the best part of your collections were destroyed by getting wet." The label on a specimen (of *Mirabilis albida*) sent to Torrey makes clear the problem, as well as Houghton's dedication to botany: "The probability that this plant is not described in the pocket manual which I had with me in our tour induced me [to] collect a great number of specimens. But only two or three days after this my canoe bilged, & all the plants I had collected for several days were thoroughly wetted. Among them was this plant,

For a week or more before the expedition departed from the Soo, Houghton collected in that vicinity, both in Canada and in Michigan. The route then led the party along the south shore of Lake Superior, and many of the same sights were seen as had fascinated the Cass expedition 11 years earlier. At Grand Sable, Houghton collected *Cirsium pitcheri*–which had just been described in the 5th edition of Eaton's *Manual,* the one Houghton had with him. On June 30 the expedition passed the Pictured Rocks, where Houghton collected crowberry, *Empetrum nigrum*–to this day one of the few locations for this species on the south shore of Lake Superior.[60] In Wisconsin, the party spent three days at La Pointe (Madeline Island), where George Johnston was in charge of Indian affairs,[61] and it then ascended the Bad River and

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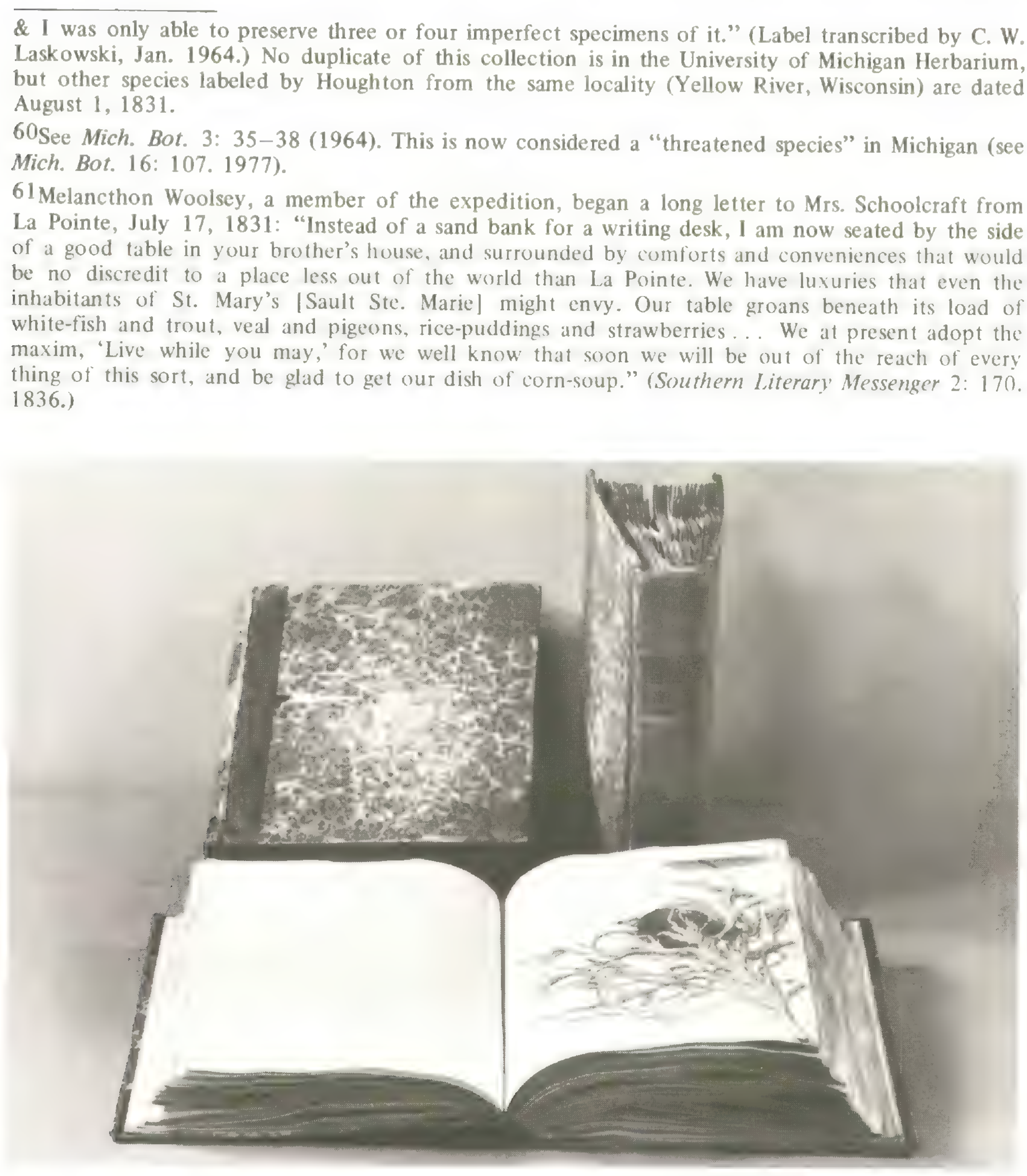
& I was only able to preserve three or four imperfect specimens of it." (Label transcribed by C. W. Laskowski, Jan. 1964.) No duplicate of this collection is in the University of Michigan Herbarium, but other species labeled by Houghton from the same locality (Yellow River, Wisconsin) are dated August 1, 1831.

60See *Mich. Bot.* 3: 35–38 (1964). This is now considered a "threatened species" in Michigan (see *Mich. Bot.* 16: 107. 1977).

61Melancthon Woolsey, a member of the expedition, began a long letter to Mrs. Schoolcraft from La Pointe, July 17, 1831: "Instead of a sand bank for a writing desk, I am now seated by the side of a good table in your brother's house, and surrounded by comforts and conveniences that would be no discredit to a place less out of the world than La Pointe. We have luxuries that even the inhabitants of St. Mary's [Sault Ste. Marie] might envy. Our table groans beneath its load of white-fish and trout, veal and pigeons, rice-puddings and strawberries . . . We at present adopt the maxim, 'Live while you may,' for we well know that soon we will be out of the reach of every thing of this sort, and be glad to get our dish of corn-soup." (*Southern Literary Messenger* 2: 170. 1836.)



Three volumes of Douglass Houghton's first herbarium, begun while he was a student at the Rensselaer School in Troy, New York (see footnote 62). A few plants from the 1831 and 1832 expeditions with Schoolcraft are included, such as the specimen of Pitcher's thistle in the open volume, collected at Grand Sable in 1831.

portaged to the Namekagon and St. Croix rivers of the Mississippi system. The type material of a sedge which Torrey later named *Cyperus houghtonii* was collected August 4 on a portage near the Namekagon. Many of the specimens from the 1831 expedition are from the Mississippi drainage in Wisconsin, although some are from the prairies of the Fox River on the return trip.[62]

Like the Cass expedition of 1820, Schoolcraft's 1831 tour had to give up any attempt to reach the source of the Mississippi because of the low state of the rivers so late in the season; and hence, while the official purposes were accomplished among the Indians, the story is not a very dramatic exploring narrative and Schoolcraft said relatively little of it in most of his subsequent literary productions.[63] He knew that he must try again to reach the true source of the Mississippi and in 1832 he was successful. An exploring expedition *per se* could hardly have been sponsored by the Office of Indian Affairs (which was under the War Department). But he convinced the Office to send him out again to extend peace, to investigate the condition of the fur trade, and to vaccinate and compile statistics on the Indians. Lewis Cass had gone to

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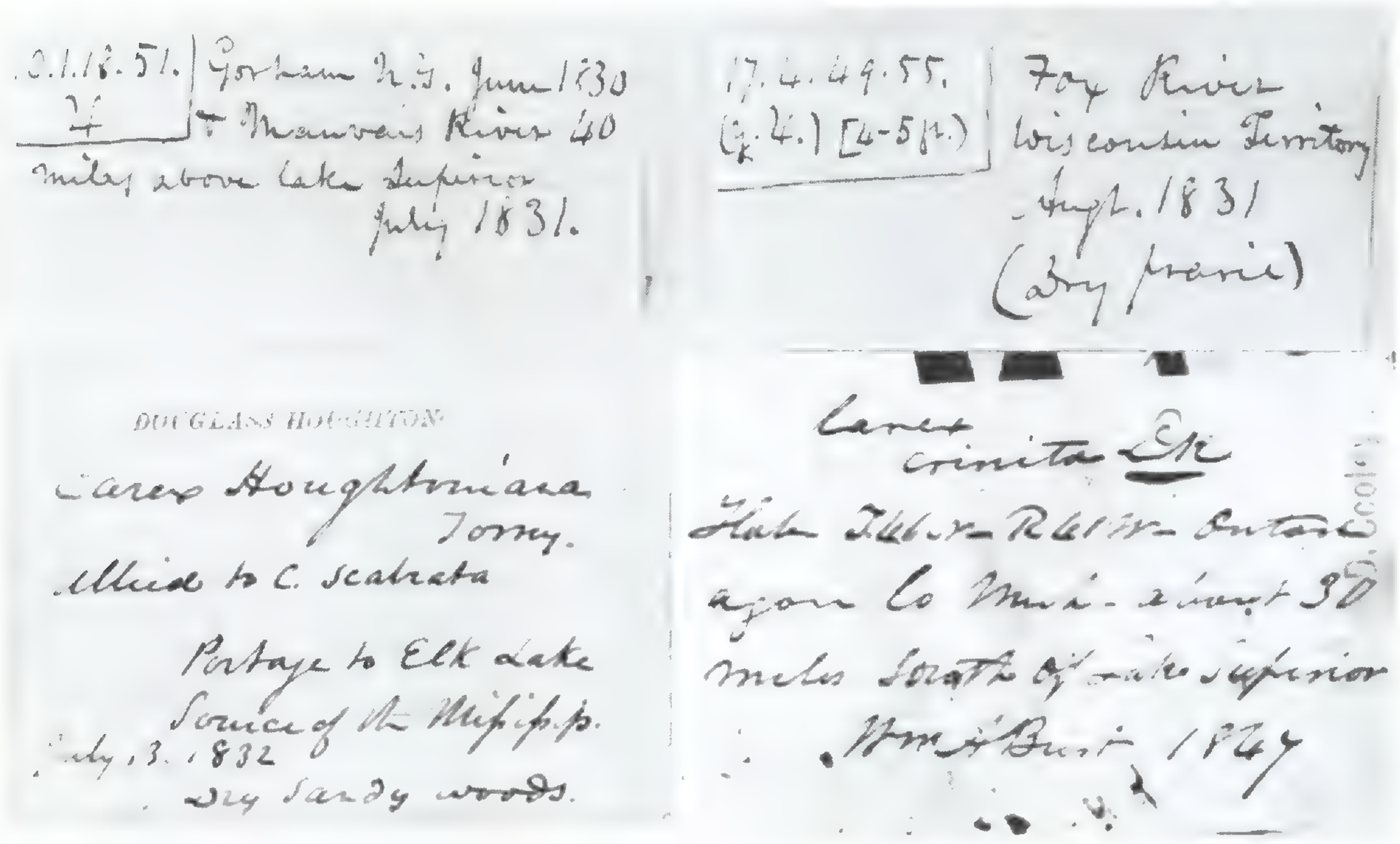
62The principal locations of specimens are at the New York Botanical Garden (from Torrey's herbarium) and at the University of Michigan Herbarium, which possesses Houghton's original five-volume herbarium, begun in his youth in New York but containing some of the 1831 and 1832 specimens, and also possesses numerous sheets from the Schoolcraft expeditions mounted and filed in the usual manner. Duplicates were widely exchanged by Houghton and others, and are found in a number of herbaria.

63Much valuable information on the 1831 expedition, including some botanical notes, usually with dates indicated, is in Schoolcraft (1851); Mason (1958) includes several relevant documents. From the extant specimens and widely scattered accounts of the expedition, I have been attempting to reconstruct the botanical results so as to provide localities and dates for as many as possible of the collections.



Above: Two labels in Douglass Houghton's hand from his herbarium as shown on p. 18. *Below left*: Label on an isotype of *Carex houghtoniana*, written by Houghton's assistant, Bela Hubbard. *Below right*: Label in Dennis Cooley's hand on a specimen collected by William A. Burt in 1847 in T46N, R41W, then in Ontonagon County, Michigan (see p. 26). (All labels slightly reduced.)

Washington to become secretary of war in 1831 so his blessing on the expedition was presumably not hard to obtain. Again, Douglass Houghton was a member of the party, at the pay of $3.00 per day,[64] with an official duty to vaccinate the Indians. The itinerary and botanical collections have been listed for the 1832 trip, about which much more has been published.[65]

The 1832 route was much the same along the south shore of Lake Superior except that it went all the way to Fond du Lac and followed the St. Louis River into Minnesota. But an earlier start (June 7 from the Soo) meant more navigable rivers. This is the better known expedition of Schoolcraft's, for on a lucky Friday the 13th of July, Schoolcraft, Houghton, and Lt. James Allen (in charge of the military escort from Fort Brady) portaged across a rise of ground to what was christened Lake Itasca.[66] They spent three and a half hours there, collected several plants, and then descended the Mississippi. The type material of *Carex houghtoniana* Torrey ex Dewey, which Houghton recognized as a new species of sedge, was among the collections from this long-sought location. Schoolcraft, describing the portage to what the Indians had called Elk Lake, assured us that "Dr. Houghton carried a plant press"[67] on this historic occasion. Collections were made in Wisconsin on the return trip, on which they portaged from the St. Croix River to the Bois Brule, following it to Lake Superior. Schoolcraft arrived at the Soo August 14 and Houghton followed on August 25. Specimens were again sent to Torrey, and duplicates distributed later to other correspondents, including the Wisconsin naturalist, Increase A. Lapham (see next chapter). Houghton sent a list of plants in a letter to Torrey November 24, 1832, as he had done March 20 for the plants of the previous season.[68] No distinction in dates, however, is made in the combined list that was published in Schoolcraft's narrative.[69]

Houghton returned for a few days late in November, 1832, to his home in Fredonia, New York, where he had been licensed as a physician in 1831. He then returned to Detroit, whence he wrote to Schoolcraft: "You will undoubtedly be a little surprised to learn that I am now in Detroit, but probably not more than I am in being here. My passage through Lake Huron was tedious beyond endurance; and so long was I detained in consequence of it, that it became useless for me to proceed to New York [to work with Torrey]. Under these circumstances, after having visited Fredonia, I determined to engage in the practice of my profession, in this place, at least until spring."[70] Houghton quickly built up a large and successful practice and was much beloved by his patients and other citizens, who called him the "Little

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[64]Mason (1958, p. 138).

[65]Specimens in the University of Michigan Herbarium are itemized, with the itinerary, by Rittenhouse & Voss (1962). The 1832 trip is related by Schoolcraft (1834, and somewhat condensed 1855). The narrative was usefully republished, with abundant additional documentation regarding the 1831 and 1832 expeditions, by Mason (1958).

[66]The superstitious should note that on the same Friday the 13th, Zina Pitcher (then far from the Great Lakes, in Arkansas) was promoted from assistant surgeon to surgeon, U.S. Army, with the rank of major (*Natl. Cycl. Am. Biogr.*).

[67]Schoolcraft (1851, p. 412).

[68]The original letter, received by Torrey in a bundle of specimens, is in the Torrey papers at the New York Botanical Garden; a photostat is in the Michigan Historical Collections. The letter, without the list of plants, is quoted by Mason (1958, p. 305); cf. note 54 above.

[69]Houghton (1834).

[70]Schoolcraft (1851, pp. 429–430); cf. also Houghton's letter of Nov. 24, 1832, to Torrey (note 68 above).

Doctor";[71] he was active in civic affairs, lectured–and collected plants. But he soon reduced his practice and in 1836 gave it up completely. He had accumulated large real estate holdings and achieved sufficient wealth in land speculation that he was financially independent for the rest of his brief career.

Michigan's admission to the Union was official at noon on January 26, 1837, and two events of considerable botanical significance for the state resulted–although neither flourished to its full potential. One was establishment of the University in Ann Arbor and the calling of its first professor; and the other was the action of the legislature in creating a geological survey.

At the fifth meeting of the Board of Regents of the University, in November of 1837, a resolution proposed by Regent Schoolcraft was approved, that an agent visit Europe to obtain apparatus and books, but no further action was taken. Schoolcraft and Pitcher, two of the most influential regents, were regular scientific correspondents of John Torrey's and the secretary of the regents was a former student of his. It is quite likely therefore that Torrey was the inspiration for Schoolcraft's advice and also for Asa Gray's application to the University of Michigan early in 1838, even though the institution existed only on paper. At first, the regents thought it premature to begin selecting a faculty. But Stevens T. Mason, governor of the state, was so impressed with Gray on a visit to New York in May that he determined to bring him to Michigan. Douglass Houghton offered Gray a post with the new geological survey, and Mason wrote him that a University position could be assured in addition. On July 17, Mason (who was *ex officio* a regent and served as president of the board) presented a communication from Gray proposing a faculty appointment commencing with a leave of absence for a trip to Europe. The regents then acted to make Asa Gray, John Torrey's young assistant, the first paid professor in the new university (which had no significant continuity with the original "university" established in Detroit in 1817).[72]

Gray visited Michigan in August of 1838, his only trip to the state, but he had time to collect very few plants here. However, he was enthusiastic about the potential of the University and proposed to obtain scientific apparatus and books on his European trip. The regents settled upon his purchasing the nucleus of a library and authorized $5000 for the purpose, as well as a salary of $1500.[73] Gray's advice was clearly sought on scientific matters (he even hoped to bring Torrey to Michigan). He arranged with George P. Putnam in London to purchase an excellent collection of books, while he himself made valuable contacts with the leading botanists and

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[71]Houghton's height was 5 ft. 5 in.

[72]In a letter to William Darlington, August 2, 1838, John Torrey wrote: "Dr. Gray has been appointed Prof. of Botany in the new University of Michigan. They have called him to the chair this early in order to secure his valuable services. He will proceed to Detroit next week to give direction for laying out the ground for an extensive Botanic Garden. In the autumn he will probably go to Europe & return next spring. This will give him an opportunity of seeing all the great botanists, & of examining the numerous herbaria which it is necessary to consult in order to settle many of our doubtful plants. The Univ.^{y} of Michigan has very large funds, & it will probably be one of the first in our country in the course of a few years. . . . They could not have found a man better qualified for the Botanical Chair than Dr. Gray. I shall be very sorry to lose him, but I think he will spend most of his winters in N. York." (I am indebted to Ronald L. Stuckey for supplying me with the transcript of this letter, which seems not to have been previously quoted, in the William Darlington papers, New York Historical Society.)

[73]Gray's connections with the University of Michigan have been presented by Bartlett (1941) and Bidlack (1962, pp. 34–73). He did some botanizing at Ann Arbor the morning of Aug. 20, 1838 (J. L. Gray 1893, 1: 81).

institutions of Europe. For making possible this critical experience in Gray's career, the regents deserve some credit; and indeed Gray is identified as Professor of Botany in the University of Michigan on the title page for volume 1 of Torrey and Gray's great *Flora of North America,* published 1838–1840. The regents asked him to serve without salary beginning with the 1840–1841 year and he stayed in New York to work with Torrey. In March of 1842 Gray was offered a professorship (at only $1000) at Harvard and he tendered his resignation to the University of Michgian, which had just begun actually to admit students that year. His illustrious career at Harvard is well known and does not concern us here.[74]

Meanwhile, back at the capital in Detroit,[75] the state government had likewise been getting organized in 1837. Two hours after Michigan became a state, a bill was introduced in the legislature for a geological survey and this was approved on February 23–the first department of state government to be created by statute. It provided for a "full and scientific description" of the state's "rocks, soils and minerals, and of its botanical and geological productions, together with specimens of the same." Houghton was named state geologist (the whole idea was his) and work commenced almost immediately.[76]

Dr. Abram Sager (1810–1877),[77] who had studied with Amos Eaton and was in general practice in Detroit, was placed in charge of botanical and zoological work and operated independently of Houghton, who also collected a few specimens himself. The only roads were in the southernmost part of the state, and the localities of extant specimens are all southern–but they were the first collections from the interior in contrast to the lake shores. In 1838 the survey was reorganized and Houghton induced Dr. John Wright (1811–1846),[78] another former student (but non-graduate) of Eaton's at the Rensselaer School, to leave a "lucrative practice" of medicine in Troy, New York, to become botanist for the survey. His assistant was George Bull, about whom we know almost nothing except that Eaton named a plant for him in 1840: *Gymnandra bullii,* now known as *Besseya bullii* or *Wulfenia bullii,* and also named *Synthyris houghtoniana* by Bentham six years later–an uncommon member of the snapdragon family (Scrophulariaceae) and now considered a "threatened species" in Michigan.[79] It was from the "prairies" of Michigan, but no type material seems to be

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[74]The definitive biography of Gray, with full references, is by Dupree (1959).

[75]The capital was not moved to Lansing until 1847.

[76]The history of geological surveys in Michigan is presented in some detail by Merrill (1920, pp. 158–239, condensed from a manuscript by Alexander Winchell). For Houghton's role, see Rintala (1954) and Wallin (1970). Houghton's reports and related documents were conveniently republished by Fuller (1928).

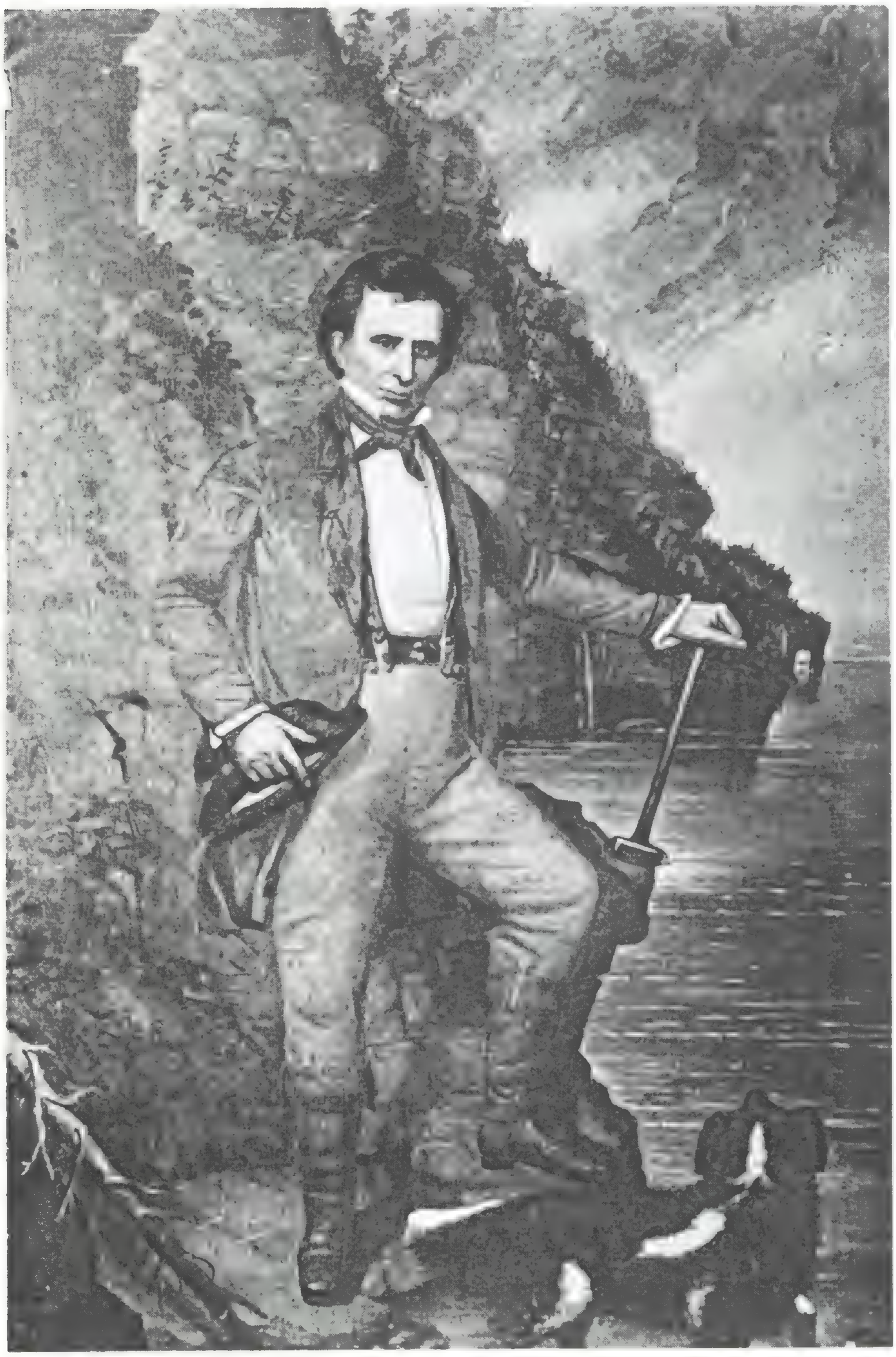
[77]On Abram Sager (A. B. Rensselaer School 1831; M. D. Castleton Medical College, Vermont, 1835), see Atkinson (1878, pp. 58–59); Nason (1887, pp. 196–197); Huber (1903); Vaughan (1905); Connor in Kelly & Burrage (1920, pp. 1013–1014)

[78]On John Wright (M. D. Yale 1833) see Nason (1887, p. 138) and Kelly & Burrage (1920, p. 1269). McVaugh (1970, p. 237) questions the year of Wright's death, citing a letter from his former medical partner, Thomas C. Brinsmade, to Abram Sager (Sager papers, Michigan Historical Collections, University of Michigan). The letter is indeed clearly dated at Troy April 25, 1845, and describes Wright's acute bronchitis and lung hemorrhaging in "November"; under these conditions it would seem unlikely that Wright would have remarried, yet he did so on December 5, 1844. All published sources, including *Catalogue of the Officers and Graduates of Yale University . . . 1701–1892* (New Haven, 1892–and later editions), give 1846 as the year of Wright's demise, and I conclude that Dr. Brinsmade's pen slipped when he dated his letter 1845. He mentioned to Sager that Wright "but a few minutes before he ceased breathing was talking cheerfully about some scenes he had witness[ed] with yourself & Geo. Bull in Michigan."

[79]See *Mich. Bot.* 16: 109 (1977).

extant. Many collections were made in 1838, again in the southern part of the state, and a bare list of over 800 species (without locality data) was published in Wright's report in 1839. Wright offered a mild complaint about the legislative requirement to collect in sets of 17:

> The bulky apparatus necessary to be conveyed from place to place, during the excursions, for the preservation of the plants in such extensive collections, and the requisite



Douglass Houghton (1809–1845), from a painting by his brother-in-law, Alvah Bradish, showing him at the Pictured Rocks with his pet spaniel. (Published by Bradish as frontispiece in *Memoir of Douglass Houghton,* 1889.)

> conveniences for drying and protecting them, render it impracticable to examine a very great extent of country, and particularly such portions of it as are unsettled, during a single season . . .[80]

Wright and Sager, as botanical and zoological assistants respectively, resigned after the 1838 season, in the face of financial panic in the state and reduced appropriations for the survey. Wright returned to New York, to become professor of botany and zoology at Rensselaer (1838 1845). Sager, who was then practicing in Jackson, Michigan, in 1842 became professor of botany and zoology in the University of Michigan, succeeding Asa Gray.[81] In 1866 he gave his own herbarium to the University.[82] George Bull remained as a "subassistant" in botany in 1839 and accompanied Houghton himself in the northern part of the state as well as working independently in the southeastern part. In 1840 the legislature abolished the zoological and botanical responsibilities of the survey completely; only a few collections are known from 1840, evidently made by Houghton himself on Lake Superior.

One of the interesting plants collected in 1839 was a goldenrod, *Solidago houghtonii,* named for Houghton, three years after his death, by Asa Gray in the first edition of his well known manual (1848). Houghton and Bull left Mackinac Island on August 14, 1839, in a rowboat with three oarsmen, bound for Green Bay. Somewhere in what is now western Mackinac County, at the north end of Lake Michigan, on August 15, they discovered this goldenrod.[83] The species is endemic to the northern shores of Lakes Michigan and Huron, growing in interdunal hollows, and is considered a "threatened species" in the United States.[84]

It is not surprising that specimens from the first survey of Michigan were sent to Gray for he was, after all, professor of botany in the University! And Gray had spent nearly the whole day of August 15, 1838, at Houghton's home in Detroit.[85] Unfortunately, many of the plants supplied to Gray are merely labeled "Michigan State Coll." without further data, and "Coll." has even been assumed by some monographers to stand for "College" (an anachronism at best) rather than "Collection."[86] Other

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[80]Wright (1839, p. 421).

[81]From 1848 to 1850, Sager was also librarian of the University. In 1850, when the medical department of the University was organized (as recommended by Regent Pitcher!), Sager assumed additional duties as professor of obstetrics, diseases of women and children; when Alexander Winchell took over botany and zoology in 1855, Sager limited himself to his medical teaching, becoming professor emeritus of obstetrics in 1874 but resigning completely from the University in 1875 in protest during the homeopathic medicine controversy. According to Huber (1903, p. 198), Sager declined the "presidency" of Rensselaer on the death of Eaton (in 1842); however in the Sager papers at the Michigan Historical Collections is a letter dated October 20, 1846, from Thomas C. Brinsmade (John Wright's former partner) offering Sager the senior professorship made vacant by the resignation of Prof. [George H.] Cook.

[82]This herbarium was cataloged by A. B. Lyons as containing 878 species and 1555 specimens, as reported by A. Winchell in his *Statement of Operations in the Museum of the University of Michigan* . . . for the year ending September 24th, 1868, p. 8 (Regents Proc., p. 298). Widely cited estimates of 1,200 species and 12,000 specimens are apparently greatly exaggerated.

[83]For details, see Voss (1956, pp. 27–28).

[84]See *Mich. Bot.* 16: 106 (1977).

[85]Letter from Asa Gray to Mrs. John Torrey, August 16, 1838, quoted in J. L. Gray (1893, 1: 76). Gray in an earlier letter (*ibid.*, p. 73) had noted that Dr. Houghton's home "is entirely occupied as a store-house for the stuff collected in the State survey. It is astonishing what a prodigious quantity of labor Dr. H. and his companions have done and what extensive collections they have made."

[86]For example, see comments in *Mich. Bot.* 6: 20–21 (1967). Gray has even been assumed to have collected these specimens.

duplicates were widely distributed (including a considerable set to Zina Pitcher),[87] and these are often more adequately labeled, although sometimes collections are attributed to Houghton which were gathered by the assistants who were in other parts of the state than Houghton on the dates specified. The botanical results of the first survey have been amply presented recently[88] so little more need be said here. Michigan was put on the "botanical map" by the survey, and this was perhaps first evident in the 8th edition of Eaton's *Manual,* published in 1840, in which he had the collaboration of Dr. John Wright, his colleague and former student and the former botanist to the Geological Survey of Michigan. Over 1,000 species are mentioned for Michigan in this edition of the *Manual.* As Eaton explained (in language we might find ambiguous): "The districts about our N. W. Lakes . . . have been in a great measure deficient in recorded localities of plants. . . . the botanical surveys of Dr. Houghton, Dr. Wright, and his diligent assistant Mr. G. Bull, have supplied these deficiencies."[89]

Houghton served two terms as mayor of Detroit (preceded and followed by Zina Pitcher), he declined an offer to become president of the University of Michigan but accepted a professorship, and was being considered for the governorship of the state at the time of his death—altogether a popular and influential citizen apart from the scientific contributions of himself and the competent associates he employed.

The first geological survey of Michigan technically expired in 1842 with no subsequent appropriations by the legislature for salaries or field work, although Houghton was still recognized as state geologist and was becoming famous for calling attention to copper in the Upper Peninsula. In response to the disastrous financial condition of the times, Houghton conceived a plan which would allow geological observations to be made: he sought permission from the General Land Office of the United States for the state geologist to require the deputy surveyors to make certain observations during their surveys, thus connecting the geological survey with the linear survey of the United States. This plan was presented by Houghton in a paper read before the fifth annual meeting, in Washington in May of 1844, of the Association of American Geologists and Naturalists, which he was then serving as treasurer.[90] The project was warmly endorsed. The land commissioner was doubtful, however, until Houghton himself offered to take the contract, which was signed late in June of 1844. Most of the work was done in 1845, when William Burt was Houghton's chief assistant.

William A. Burt (1792–1858)[91] was a remarkable man, whose early career was in Erie County, New York, where he was an excellent mechanic, justice of the peace, and postmaster. He moved to Michigan in 1822, and engaged in building mills, including those at Dexter. He settled in the township of Washington, Macomb County, north of Detroit, and served in the territorial legislature. In 1831 he was elected county surveyor and two years later became a postmaster and a judge as well as a U.S. deputy

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[87]See Meyer & Elsasser (1973, p. 383).

[88]McVaugh (1970).

[89]Eaton & Wright (1840, p. 16). (I would have said that the deficiencies had been met, rather than supplied, by these diligent botanists!)

[90]This was the organization which became the American Association for the Advancement of Science in 1848. Houghton's note to the chairman of the local committee, stating his intention to attend the May meeting "unless prevented by causes not now known to me" is in the manuscript collection of the Academy of Natural Sciences, Philadelphia, *fide* R. L. Stuckey. The proposal to combine surveys was published in the proceedings of the meetings (Houghton 1844).

[91]On William Austin Burt, see Leeson (1882, pp. 241–243); Cannon (1884); H. E. Burt (1922).

surveyor. This was the beginning of a career in surveys of public lands and railroad routes in Michigan, Iowa, and Wisconsin. (He ran the township lines where Milwaukee now stands.) In 1840, Burt received a contract to commence the surveys of the Upper Peninsula of Michigan, work in which he remained for most of the decade. Distressed by deflection of the magnetic compass, he had invented the solar compass (patented in 1836), which served him well in the Upper Peninsula, where it was he who discovered iron ore in 1844 near Marquette and in 1846 in the Menominee district. (He also, incidentally, patented in 1829 the first typewriter, and in 1856, the equatorial sextant.)

Burt is mentioned here not because of his inventions or his collaboration with Houghton in combining geological observations with the linear surveys, but because he also collected plants. Many of his specimens were supplied to Dennis Cooley, a neighbor in Washington Township, and came with Cooley's herbarium to the Agricultural College, now Michigan State University. The notable feature about Burt's collections is the detailed localities on their labels. Many specimens of the time were merely labeled, e.g., "Lake Superior"—without mention of state or even country, or "Michigan," or occasionally with the name of an island, river, or other landmark. Burt's specimens, like the more precisely labeled ones of good collectors today, have the survey township recorded, e.g. "T46N-R41W . . . about 30 miles south of Lake Superior . . . 1847." But then, *he* was running the survey lines! No one else could know with such precision exactly where he was in the wilds of the Upper Peninsula at the time.

Plant collecting was carried on by other surveyors, friends of Burt's, such as George H. Cannon, some of whose specimens also entered Cooley's herbarium. In addition, of course, the surveyors left valuable notes on the vegetation of the areas through which their lines passed. The species of bearing and line trees which they recorded have been analyzed to map the original vegetation of many areas.[92] One of these witness trees, blazed by Burt June 17, 1850, stands to this day, a lofty red pine well known as an attraction in the Pigeon River Country State Forest, Otsego County, in northern Lower Michigan.

Dennis Cooley (1787–1860),[93] Burt's botanical mentor, was a native of Deerfield, Massachusetts, and practiced medicine for five years in Georgia before moving to Washington Township, Macomb County, Michigan, in 1827—five years after Burt settled in the same township—and where he practiced until 1856. Like so many medical men of his day, Cooley was an ardent botanist, and he accumulated a herbarium variously estimated at 4,000 and 20,000 specimens, which was presented by his widow in 1863 to the Agricultural College. In 1853 Burt completed a manuscript list of the flora near his home, but it seems no longer to be extant.

Following Houghton's death by drowning in Lake Superior in October of 1845, his assistants, William Burt and Bela Hubbard, continued their surveys through 1846. Then in 1847 Congress authorized continuation of the survey of U.S. mineral lands in Michigan, and Charles T. Jackson[94] was placed in charge. Jackson had just done

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[92]For a recent example and summary of methods—with reference to Burt's original survey, see Frederick et al. (1977).

[93]On Dennis Cooley (M. D. Medical College of Berkshire, Mass., 1822), see Kenaston (1863, pp. 19–21); Leeson (1882, p. 817); Beal (1902a); Barnhart (1921). Kenaston, Leeson, and Barnhart give Cooley's year of birth as 1789, but Beal's date of 1787 (given by Barnhart 1965) is in accord with the Washington cemetery record, which gives his age as 73 at his death Sept. 8, 1860.

[94]On C. T. Jackson, see chapter 8 and note 299, below.

surveys in Maine, New Hampshire, and Rhode Island (as well as in Nova Scotia during his summers at Harvard) and was well known for mineral analyses in his private laboratory.[95] In 1844 and 1845 he had visited the copper region of Lake Superior on behalf of Boston interests. Jackson's report, published by Congress in 1849, included not only geological reports by Burt and Hubbard on surveys of township lines in 1845 and 1846 but also a "Catalogue of plants collected by William A. Burt, Esq., on the primitive region south of Lake Superior in 1846." The catalog is by Dennis Cooley, to whom Burt referred his specimens, and it lists over 180 species, usually with survey townships indicated.

Upon Jackson's resignation in 1849, two of his assistants, J. W. Foster[96] and J. D. Whitney, were named to continue the work. The second part of their report, published by Congress in 1851, includes a botanical chapter by Whitney's younger brother, W. D. Whitney (1827–1894),[97] who studied Sanskrit in spare moments in the Michigan wilderness, became largely diverted from natural sciences, and later became a distinguished philologist at Yale. The nature of the Upper Peninsula terrain was aptly described by Foster and Whitney in their introduction: "Nearly the whole of this area is an unbroken wilderness, interspersed with tangled thickets, almost impassable marshes and inland lakes, which retard the progress of the explorer; . . . Passing weeks in succession in the midst of the forest, with no trace of the works of man around us, except the surveyors' lines, we have encountered difficulties unknown and unappreci-

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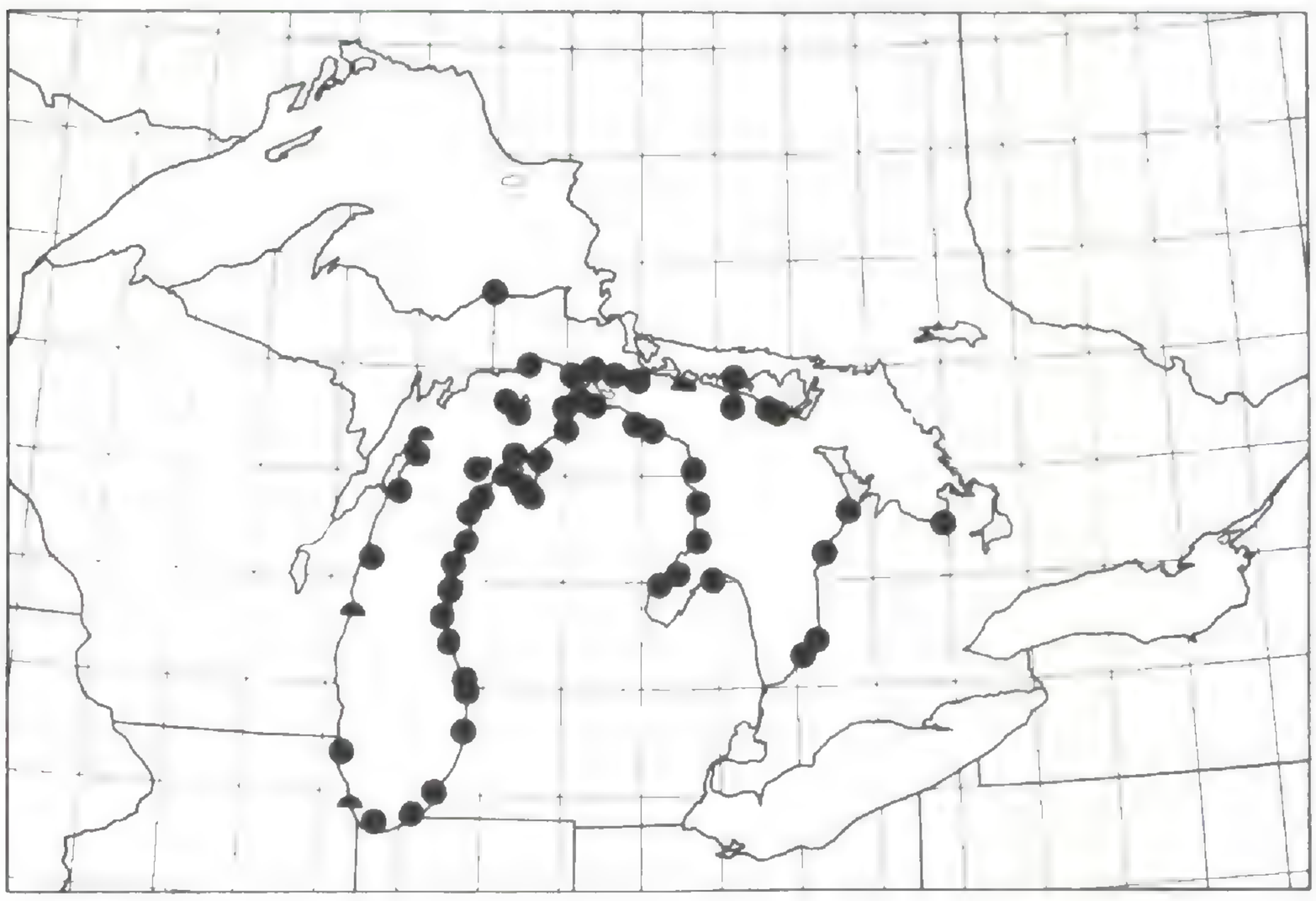
[95]See Abbott (1971, p. 234).

[96]On J. W. Foster, see chapter 8 and note 301, below.

[97]On William Dwight Whitney, see Lounsbury (1895) and Bender in *Dict. Am. Biogr.* 20: 166–169 (1936). See also note by Fernald (*Rhodora* 37: 336–337. 1935); Fernald refers to a "frequent assumption" that W. D. Whitney was really J. D. Whitney, but the assumption seems to have been principally his own (*Rhodora* 7: 150. 1905).



Distribution of Pitcher's thistle, *Cirsium pitcheri*, endemic to the upper Great Lakes shores (see p. 14). (From Guire & Voss 1963, p. 102.)

ated by geologists in a more civilized and less inhospitable region."[98] W. D. Whitney's report listed over 400 species of vascular plants from the Upper Peninsula, many of them with localities indicated including, for example, Pitcher's thistle at Grand Sable. Notes on the trees and some of the shrubs are especially extensive. Evidently the report is based solely on observations by members of the field party between July 1 and October 1, 1849; there is no indication as to how many of the species noticed were actually collected, but some specimens of Whitney's are to be found in the Gray Herbarium. One of these is the arnica described by Fernald[99] in 1935 as *Arnica whitneyi*—named for Whitney and to this day known only from Keweenaw County, Michigan, and the Sibley Peninsula of Ontario, to the north. (Whitney had included it in his list as *A. mollis,* from Copper Harbor; it is now sometimes considered a variety of the western *A. cordifolia.* However it is classified, it is considered endangered in Michigan.[100])

This is a natural point at which to leave, temporarily, the geological survey of Michigan and its natural history correlates. The overlapping connections in personnel and interests from Cass to Schoolcraft to Houghton to Burt show a continuity which could hardly be interrupted to look at simultaneous developments on the other side of Lake Michigan or on the north shore of Lake Superior. As John Torrey wrote to a correspondent in 1847: "Since the death of Prof. Houghton, Nat. History has retrograded in Michigan."[101]

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[98]Foster & Whitney (1851, p. iv).

[99]In *Rhodora* 37: 334–337 (1935).

[100]See *Mich. Bot.* 16: 106 (1977).

[101]Torrey to Harry N. Patterson, May 27, 1847, as quoted by Kibbe (1953, p. 509).

Chapter 3.

THE INCREASE OF BOTANY IN WISCONSIN

In the area now known as Wisconsin, as in Michigan, the first references to plants are by French missionaries, explorers, and traders—and they are fragmentary. Wild-rice and other edible plants received particular notice.[102] Casual botanical observations are about all one might expect during what we may call the pre-Linnaean and early post-Linnaean years, when not only was knowledge of the Great Lakes new from almost every standpoint, but also the science of botany itself was developing. In Wisconsin, as in Michigan, the first purely scientific work was by Thomas Nuttall, followed by the expeditions of Cass, Schoolcraft, and Houghton, all of which have been mentioned.

The man to whom is due chief honor in Wisconsin is Increase A. Lapham (1811–1875),[103] that state's first resident botanist, indeed first scholar in many fields for, like so many of his contemporaries, he was by no means restricted to a single discipline. Even for those days of diverse attainments, Lapham was a man of remarkable accomplishments in botany, zoology, geology, meteorology, cartography, archeology, and engineering. He was born of Quaker stock in the state of New York in 1811, one of 13 children, and helped his father, a contractor, on construction of the Erie canal, the Welland canal, and other projects. In 1827, he moved westward to Ohio and that year—at the age of 16—submitted his first paper for publication in the *American Journal of Science,* beginning a lifelong correspondence and friendship with its editor, Benjamin Silliman. The young Lapham was for three years assistant engineer on the Ohio canal, kept a journal with records of the weather and observations on natural history, and published two more papers on the geology of Ohio. Ten weeks after Wisconsin Territory was separated from Michigan Territory, Lapham arrived in

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[102]Cheney (1900, p. 558) asserts that Jean Nicolet, who is credited with the discovery of Lake Michigan in 1634, referred "in his notes" to a single Wisconsin plant, wild-rice, observed as the principal food of the Indians at Green Bay. However, Nicolet left no "notes"; the Jesuit *Relations,* which are our source of what little "original" account there is of Nicolet's trip, say nothing of wild-rice. Cheney cites as his source C. W. Butterfield's *History of the Discovery of the Northwest by John Nicolet in 1634* (Cincinnati, 1881). However, Butterfield (footnote 2, p. 57) clearly stated that he based his description of the Menomonees on accounts from "dates some years subsequent to Nicolet's visit." *If* there were evidence that Nicolet found Indians using wild-rice, which at best is extremely rare on the southeast side of Lake Superior, it would support the assumption that Nicolet did arrive in Wisconsin on his search for a short route to China, rather than on Lake Superior as claimed by some (see Clifford P. Wilson in *Minn. Hist.* 27: 216–220 (1946) and Harry Dever in *Mich. Hist.* 50: 318–322 (1966).)

The importance of wild-rice, so frequently mentioned in early Wisconsin reports, is in marked contrast to Michigan, where, for example, the U.S. commissioner of Indian affairs, noting that nearly 14 million acres of Michigan had been ceded by the Chippewa and Ottawa Indians in 1836, reported that the Chippewas depended for no part of their subsistence "within the *present* limits of Michigan" on wild-rice, "a plant common at more northerly and westerly points." (25th Congress, 2nd Sess., U.S. Senate Doc. 1, p. 531. 1838 [Doc. 314]).

[103]One of the most comprehensive biographical sketches of Increase Allen Lapham is by N. H. Winchell (1894); see also Hoy (1876); Quaife (1914); Still (1938).

Milwaukee on July 1, 1836, having traveled over 1,200 miles from Reading, Ohio–mostly by steamboat from Cleveland.

Lapham was brought to Wisconsin by Byron Kilbourne (for whom he had earlier worked) at a salary of $1000 per year to assist in surveying, canal-building, and promoting. During the year and a half before his arrival, Milwaukee had grown from 10 residents in two families to a population of about 1,000. Lapham soon entered into the spirit of speculation and growth, perhaps following the example of Douglass Houghton, whom he had visited in Detroit en route. "Dr. Houghton," Lapham wrote from Detroit to a brother, "gave me many fine plants from the Northwest. He has made a fortune here by speculation . . ."[104] And to Charles W. Short, Lapham wrote: "I saw Dr. Houghton at Detroit–He has been too much occupied with his profession

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[104]I. A. Lapham to Darius Lapham, June 21, 1836. An interesting vignette of Detroit is in the same letter: "Detroit is a fine city one hundred and thirty-five years old; it contains about 8,000 inhabitants, several fine four-story brick buildings, numerous fine churches and a market-house as large as an ordinary Presbyterian church and built much in the same style! I went to church yesterday, and on coming out, I was surprised to see a row of one-horse carts, precisely similar to those used carting dirt on the canal, standing in front of the church, apparently waiting for something or somebody. I had the curiosity to wait also and see what was the object, and you may well suppose that my surprise was not lessened to see many fine gentlemen and ladies come out of the church and get into those carts, sitting flat on the bottom, having only a mat or some hay under them! A driver took his *stand* amongst them and drove off in, what I suppose they consider fine style. This appears to be the usual mode of traveling about the city." This was the city which became the automobile capital of the world!

Increase A. Lapham (1811–1875). (From N. H. Winchell 1894, facing p. 1.)

and with the speculation to attend to scientific pursuits. He supplied me with many interesting plants, some from the very source of the *Father of Waters*!"[105] Asa Gray, to whom Lapham also wrote from Detroit, encouraged him to collect. He corresponded and exchanged specimens not only with Gray, Houghton, Short, and Silliman, but also with a very large number of other leading scientists of the day, including Louis Agassiz, William Boott, Chester Dewey, George Engelmann, J. W. Robbins, Thomas Say, W. S. Sullivant, John Torrey, George Vasey, Alphonso Wood, and "nearly every American botanist and a large number of foreign ones."[106]

Lapham had not been in Milwaukee a year when he published a catalog of the plants and shells of the vicinity, a 12-page pamphlet which seems to be the first scientific work to have been published in Wisconsin Territory.[107] It included a simple alphabetical list of a little more than 100 species of vascular plants, without further locality data or habitat. This was revised two years later to almost 400 species, with two mosses, and a supplement in two more years added another 145 species.[108] By 1853, Lapham was able to publish a sparsely annotated catalog of about 950 species for the entire state.[109] Supplements to this report appeared in later years, partly the work of Thomas J. Hale.[110]

Lapham lived to the age of 64 and thus was able to exemplify even more than his Michigan contemporary, Douglass Houghton, who died at 36, the development of resident botanical talent. He was not the transient explorer, passing through the state and plucking plants along the route. A pillar of Milwaukee, promoting its growth and investing in real estate, he helped to lure prospective settlers by his maps and books on Wisconsin; in addition, he was the resident scientist, promoting at the same time numerous scientific endeavors.[111] Described as "a small, spare, grey whiskered, spectacled man, methodical and reserved in manner,"[112] Lapham was not a man with excess time on his hands! He built up a large herbarium of some 24,000 specimens, both by his own collecting and by his exchanges (through which his Wisconsin specimens became dispersed widely), which was acquired after his death by the University of Wisconsin—the only portion of Lapham's collections not lost by fire December 1, 1884.[113]

The relatively short-lived Wisconsin Natural History Association was organized in

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[105] I. A. Lapham to Dr. Short, Aug. 17, 1836. I am indebted to R. L. Stuckey for supplying transcriptions from the copies of Lapham's letters in the manuscript collection of the Ohio Historical Society Library; the originals are in the Lapham papers at the State Historical Society of Wisconsin.

[106] Arthur (1881).

[107] Lapham (1836). The facsimile issued in 1976 was made from the copy presented by Lapham to Miss Ann M. Allcott of Marshall, Michigan, whom he married soon after; a photograph of the original inscription is included with some copies of the facsimile, which also added an explanatory page about the work.

[108] A rather full accounting of early Wisconsin botanical publications is given by Cheney (1900–1901), making repetition unnecessary here.

[109] Lapham (1853); the earlier explorations of Nuttall, Douglass, Say, and Houghton in Wisconsin are mentioned. As a result of his own excursions to neighboring states, plus literature and reports he considered reliable, Lapham also published the first catalogs of the flora of the states of Illinois (1857) and Minnesota (1875—but written 1865).

[110] See Musselman (1969). The exact date of neither the birth nor the death of Hale seems to be known, but he flourished botanically for a few years and did some collecting near Lake Michigan.

[111] See Still (1938).

[112] William G. Bruce in *Wis. Mag. Hist.* 18: 42 (1934).

[113] Schorger (1947, p. 174).

Lapham's office on March 3, 1848 (less than three months before Wisconsin became a state), for "mutual improvement in knowledge of the natural sciences; the study and development of the natural productions of Wisconsin; and the encouragement and diffusion of a taste for the pursuit of those enobling sciences among the citizens."[114] Lapham served as president of the Association, but his breadth of scientific interests was not necessarily shared by members who had a specific scientific hobby and who were inclined to attend meetings only when the agenda included a subject in which they possessed some knowledge. The Association soon became inactive but was revived by the governor in 1853 in order to sponsor a museum in Madison. Negotiations to acquire Lapham's extensive collections (including ethnological, archeological, and geological material) broke down, but the museum operated from 1853 until 1855 or soon afterwards. The Natural History Association transferred its activity back to Milwaukee and continued more or less active until 1863. Nothing was published under its auspices, but it did promote an active interest in natural history and was doubtless some stimulus to the founding, in 1857, of the Naturhistorische Verein von Wisconsin.

This society flourished and rapidly accumulated collections which became too large to manage. In 1882 it resolved to donate its collections and property to the city of Milwaukee. Following authorizations by the city and the legislature, the Public Museum of the City of Milwaukee was organized in 1883.[115] Another durable Wisconsin institution has been the Wisconsin Academy of Sciences, Arts, and Letters, which was founded in Madison in February of 1870. Lapham aided in its organization and served it as general secretary until February, 1873. The first volume of the *Transactions*, which the Academy promptly began publishing, appeared in 1872.[116]

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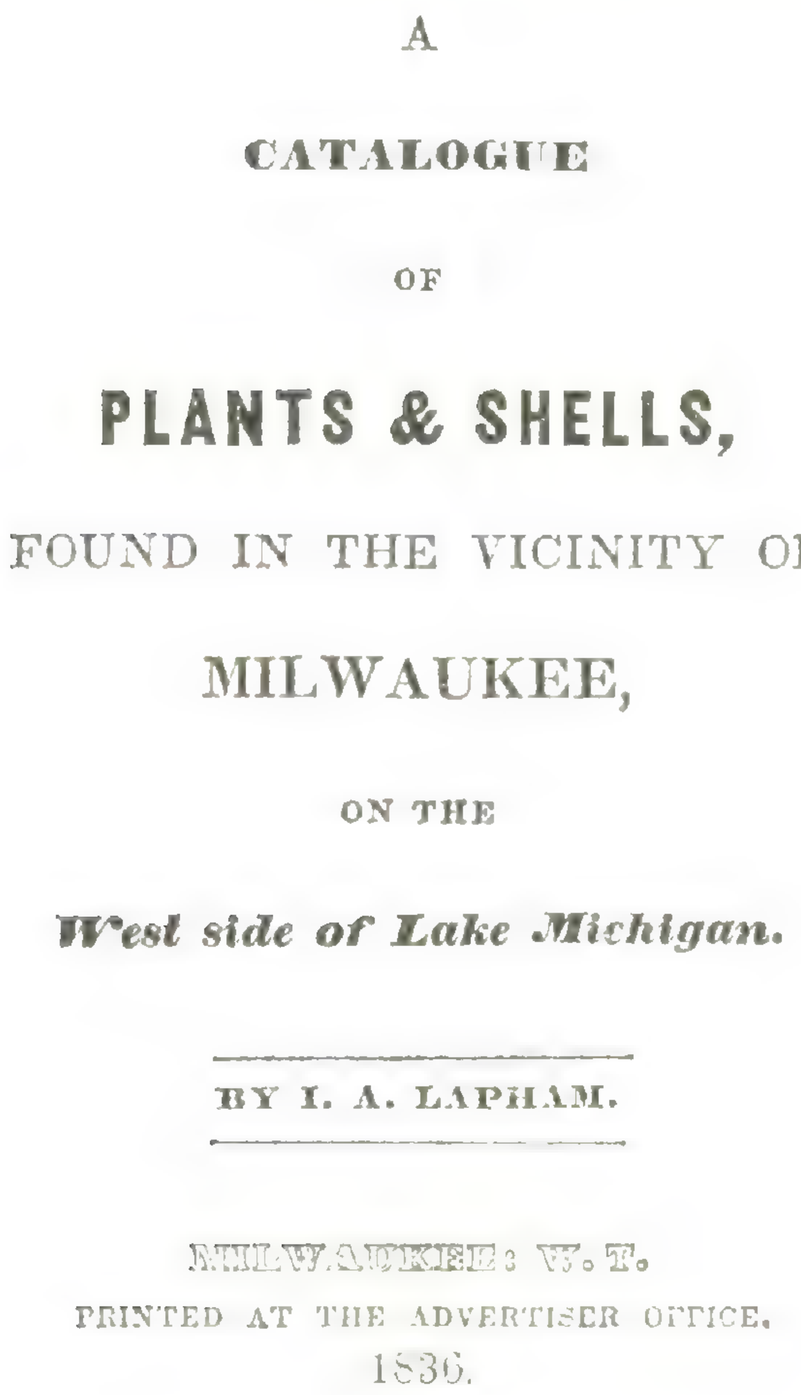
[114]Schorger (1947, p. 169).

[115]See Thal (1922).

[116]On the Wisconsin Academy, see Chamberlin (1921) and Kroncke (1970).



A

CATALOGUE

OF

PLANTS & SHELLS,

FOUND IN THE VICINITY OF

MILWAUKEE,

ON THE

West side of Lake Michigan.

BY I. A. LAPHAM.

MILWAUKEE: W. T.

PRINTED AT THE ADVERTISER OFFICE.

1836.

Title page (reduced) of Lapham's Catalogue of 1836, the year that Wisconsin Territory was separated from Michigan Territory, a year before Milwaukee was incorporated, and 12 years before Wisconsin was admitted as a State.

For Lapham, "as for many men of science in this era, nature was the main laboratory, the naked eye the chief instrument, and the collection and comparing of specimens and natural phenomena the chief method of research."[117] Unsuccessfully promoting the idea of a state natural history survey, Lapham pointed out to the legislature in 1855 that "the present is the proper time for making these investigations, before any more of the native species become extinct. . . . Soon it will be too late to secure specimens, or learn anything of the nature and habits of these species."[118] A century before extensive "official" activity on behalf of endangered and threatened species, another distinguished Wisconsin naturalist, Thure Kumlien (1819–1888)[119] lamented destruction of the flora, through loss of habitat: "A large number of our plants have gradually become rare and some of them completely eradicated."[120] Kumlien, who came to Milwaukee from Sweden in 1843 and who was the first teacher in botany of Edward L. Greene, sent many natural history specimens abroad as well as building up collections for schools and museums in Wisconsin and elsewhere in the United States. A former student of Elias Fries at Upsala, Kumlien was said to know every kind of tree, flower, moss, lichen, and mushroom in southern Wisconsin. He was employed 1881–1883 as taxidermist and conservator by the Wisconsin Natural History Society (Naturhistorische Verein von Wisconsin) and, until his death, remained under the new management when the city of Milwaukee took over the Society's museum.

One of the interesting persons whose botanical activities flourished after those of Lapham was T. A. Bruhin (1835–1896),[121] a Catholic priest (O.S.B.), born in Switzerland, where he also died. In 1869 he came to Milwaukee and he served parishes in Neu Cöln, Centreville, and Potosi, Wisconsin, until 1881, when he moved to Columbus, Ohio, for four years. Bruhin published copiously on the flora of Wisconsin, usually in Austrian journals or in German-language newspapers of Milwaukee. In his comparative flora of Wisconsin,[122] written the year after Lapham's death, and in later papers, Bruhin was especially interested in considering Old World plants cultivated or established in North America and American plants introduced in Europe, as well as species common to both continents. His lists include compilation from previous work as well as original records from Wisconsin.

Of course, not all early explorations by Wisconsin botanists in the Great Lakes area were confined to the Milwaukee region. Among those who ventured farther north was L. S. Cheney (1858–1938),[123] a student and later professor at the University of Wisconsin, who collected in the summer of 1891 "at various points in northern Wisconsin, along the north shore of Lake Superior, and along the boundary between Minnesota and Ontario."[124] He listed 345 species as a result, all with good locality data, including bryophytes, in which he was especially interested.

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[117]Kroncke (1970, p. 163).

[118]Quoted by Schorger (1947, pp. 175–176).

[119]On Thure Ludwig Theodore Kumlien, whose center of activity was in Jefferson County, technically just west of the Lake Michigan basin, see Greene (1888) and Lawson (1921).

[120]Kumlien (1876).

[121]On Thomas Aquinas Bruhin, see Cheney (1901, pp. 4–6) and Barnhart (1965, 1: 268).

[122]Bruhin (1877).

[123]On Lellen Sterling Cheney, see Conklin (1941).

[124]Cheney (1893).

Chapter 4.

THE BROTHERS WINCHELL AND DEVELOPMENTS FROM MICHIGAN TO MINNESOTA

Alexander Winchell (1824–1891),[125] born in Dutchess County, New York, developed an ardent interest in botany following his graduation in 1847 from Wesleyan University. His first published scientific paper was his only strictly botanical one, on local flora in Dutchess County, published in 1851. He came to the University of Michigan initially in 1854 as professor of physics and civil engineering. However, he managed to have himself appointed the next year as professor of geology, zoology, and botany, succeeding Abram Sager. In 1859 he was further appointed by the governor as state geologist, under the new geological survey established by the legislature. In the tradition of Louis Agassiz (who had recommended him for the Michigan position), he introduced laboratory instruction in botany at the University and distinguished himself as a geologist, lecturer, and influential teacher of botanists and others. Among those influenced was his younger brother, N. H. Winchell (1839–1914),[126] who entered the University of Michigan in 1858, graduated in 1866 (having taught school intermittently), and received a master's degree in 1869.

Although A. Winchell apparently did little if any collecting of plants in Michigan, N. H. Winchell served as a "volunteer collector" in 1859 for the geological survey and in the 1860 season he was employed at $30 per month as a "subassistant"[127] or "in the special capacity of botanical collector and assistant."[128] Beginning in early June of 1860 he accompanied parties in the field, from Saginaw Bay to the islands at the north end of Lake Huron (with special emphasis on Drummond Island), Sault Ste. Marie, and the north end of Lake Michigan, down to Grand Traverse Bay.[129] Unfortunately, specimens collected during this season have not been encountered, although they ought to be in the University of Michigan Herbarium.[130] However, N. H. Winchell did prepare a "Catalogue of Phaenogamous and Acrogenous Plants Found Growing Wild in the Lower Peninsula of Michigan and the Islands at the Head of Lake Huron," which was published in his brother's first (and only) biennial report in 1861. This was the first attempt to list all the plants of the Lower Peninsula and was based on previous published and unpublished sources as well as the observations of 1859 and 1860. It cites many specific localities and was quite an achievement for someone who had just entered the University two years previously!

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[125]Among many references on Alexander Winchell, see Merrill (1920, p. 203 *et sqq.*—this account actually by Winchell); Mains (1943, pp. 495–497); Jones (1977, pp. 268–272); and, especially, Davenport (1951a).

[126]On Newton Horace Winchell, see Gale (1911); Minnesota Academy of Science (1914); Upham (1915); and Davenport (1951b).

[127]Merrill (1920, pp. 208, 213).

[128]A. Winchell (1861, p. 245).

[129]A. Winchell (1861, p. 27); see also Voss (1956, pp. 29–30).

[130]Perhaps they were among the stored collections lost in the fire of 1913 (Mains 1956, p. 1447).

The geological survey effectively died of fiscal insufficiency during the Civil War, although Alexander Winchell was still looked upon as state geologist. In 1869, efforts were successful in the state legislature to revive the survey and Winchell was commissioned as director by the governor. N. H. Winchell was employed by the survey in 1869 and 1870. In 1871, A. Winchell resigned in protest over restrictions by the legislature (which had failed to provide for publication of the results of the survey) and in 1873 he resigned his University professorship to accept a position elsewhere. When he returned in 1879 to Ann Arbor, where he remained until his death, he was professor of geology and paleontology, botanical instruction having passed after his departure in 1873 to two of his former students, Mark W. Harrington and Volney M. Spalding.[131]

There were some rather direct connections between Michigan and scientific developments in Minnesota, which had been organized as a territory separate from Wisconsin in 1849 and admitted as a state in May of 1858. Early efforts at a geological survey were officially limited to geological matters and accomplished little. Thomas Clark (1814–1878),[132] assistant state geologist in 1864 and one of the "commissioners" ordered appointed by the second state legislature in 1860, did publish an annotated list of about 100 species of northeastern Minnesota in 1865. It comprises mostly cultivated plants and trees, arranged alphabetically by common name; localities cited range from Pigeon Point to Duluth along the Superior shore, with Superior and La Pointe, Wisconsin, also mentioned. Clark was a civil engineer, born in New York state, who lived in Ohio and Wisconsin (surveying the original plat of Superior) before moving to Minnesota, where he lived at the town of Beaver Bay, which he surveyed in 1856. He was a state senator 1859–1860.

Alexander Winchell was asked by the governor to visit Minnesota in 1870 to examine and report on salt springs. We can imagine that Winchell may have discussed the examples of the first Michigan survey, under Houghton, and the second, under himself, both of which included botanical and zoological as well as geological work. For in 1872 the Minnesota legislature established a comprehensive geological and natural history survey as proposed by president W. W. Folwell of the University of Minnesota. N. H. Winchell, who was then employed by the Ohio Geological Survey, was asked by Folwell to become state geologist (and professor of mineralogy and geology).[133] He assumed his duties in September of 1872 and served as state geologist for the rest of the century (although relinquishing his teaching duties in 1878). Warren Upham (1850–1934),[134] assistant geologist 1879–1885 (and later librarian and secretary of the Minnesota Historical Society), compiled a catalog of the flora of Minnesota, which was published in 1884. It reviewed previous work, beginning with Torrey's list of Capt. Douglass' plants and including a list prepared in 1865 by I. A.

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131 See Mains (1943, pp. 496–497).

132 On Thomas Clark, see Upham (1920, pp. 146 & 644).

133 The organization of the Minnesota survey was unique in being administered through the University. On the history of surveys in Minnesota, see Merrill (1920, pp. 239–255), based on N. H. Winchell (1889).

134 On Warren Upham, who came to Minnesota from New Hampshire in 1879, and who succeeded N. H. Winchell in 1914 as archeologist for the Minnesota Historical Society, see *Natl. Cycl. Am. Biogr.* 7: 127–128 (1892); Upham & Dunlap (1912, p. 801); Emmons (1935); Emmons in *Dict. Am. Biogr.* 19: 124–125 (1936). These all say nothing of Upham's botanical work; Emmons' memorial even omits botanical titles in its bibliography.

Lapham, who collected in Minnesota on several occasions.[135] Upham's list covered all vascular plants and was well annotated.

The intensity of botanical work for the Minnesota survey fluctuated. In December of 1875, the regents of the University ordered a thorough and systematic examination of the plant life of the state, a project supported by Winchell, who addressed a circular letter to the botanists of the state in the spring of 1876, soliciting their support.[136] But in 1878, botanical and zoological work was ordered kept in abeyance.[137] Much of the published literature on the Minnesota flora deals, of course, with portions of the state beyond the area of the Great Lakes. The earliest collections from the Lake Superior region (Duluth northeastward to the international border) were made around 1870 by persons from the U.S. Lake Survey (see chapter 6 below) and other "outsiders." But in 1878, Benedict Juni (1852–?),[138] then a University of Minnesota student, was appointed as a botanical and field assistant to the Minnesota survey (paralleling N. H. Winchell's own employment, while still a student, by the Michigan survey) and he gave "a few leisure hours" to collecting along the Superior shore although his duty was "in another line"; in 1879 he published a pioneering report on the plants of this region (mostly without detailed localities). The following season (1879), another student, Thomas S. Roberts (1858–1946),[139] while assisting geologist C. W. Hall, collected extensively along the Lake Superior shore; his list of 290 species was published in 1880 and includes many not noted by Juni.[140]

Yet another young employee of the Minnesota survey from 1876 to 1885 was Clarence Luther Herrick (1858–1904),[141] a native of the state, who had organized a "Young Naturalists' Society" with T. S. Roberts and others in the Twin Cities region even before entering the University as a subfreshman in 1875. As was true of many of his contemporaries, he was interested in plants and animals as well as in geology; like Alexander Winchell, he was later described as representative of the last of the tradition of great naturalists exemplified by Louis Agassiz. In 1885, Herrick received an M.S. degree from the University of Minnesota and accepted a position as professor of geology and natural history at Denison University, Granville, Ohio. He spent several weeks the following summer with a group of Denison students on the northeast shore

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135 Lapham's list was published posthumously in 1875 with a prefatory note by N. H. Winchell, who stated: "With a generous and cosmopolitan spirit which characterized him in his scientific labors, he sent the manuscript of the following catalogue of the plants of Minnesota to the writer, soon after the initiation of the geological survey of the State . . . as a free contribution to the natural history of the State of Minnesota, which would be capable of producing more good in the possession of the officers of our survey than in his own. . . . It is the first attempt ever made to make out anything like a complete list of our native vegetation. It is the embodiment not only of the labors of Dr. Lapham himself but also of all his predecessors, in studying the botany of Minnesota." The catalog is solely a list of names, without annotations, but does include bryophytes and lichens. Much of the previous work cited by Lapham in his introductory paragraphs dealt with portions of Minnesota beyond the Lake Superior basin.

136 See *Geol. Nat. Hist. Surv. Minn. Ann. Rep.* 5 (for 1876): 6–7, 64–66 (1877); Davenport (1951b, p. 220).

137 *Geol. Nat. Hist. Surv. Minn. Ann. Rep.* 7 (for 1878): 7 (1879).

138 On Benedict Juni, see Upham & Dunlap (1912, p. 390). A Swiss who came to Minnesota in 1859, he was captured by Sioux Indians in 1862. See also W. W. Folwell, *History of Minnesota* (Minn. Hist. Soc., 1924), 2: 125. Juni attended the University of Minnesota 1876–1879 but received no degree, I am informed (1978) by Maxine B. Clapp, Archivist.

139 On Thomas Sadler Roberts, physician and ornithologist, see Breckenridge & Kilgore (1946); also C. J. Herrick in *Sci. Monthly* 54: 366 (1942).

140 On the collections of Juni and Roberts, see also Butters & Abbe in *Rhodora* 55: 75–76 (1953).

141 On Clarence Luther Herrick, see C. J. Herrick (1947; 1955).

Newton H. Winchell (1839–1914), probably in the late 1870's. (Minnesota Historical Society)

of Lake Superior, at Michipicoten Bay, where the primary interests were geological; but "plants and other specimens were collected."[142] No biological specimens are mentioned in the published report of the summer.[143]

By the 1880's and 1890's, John M. Holzinger (1853–1929), Conway MacMillan (1867–1929), John H. Sandberg (1848–1917), Edmund P. Sheldon (1869–1913),[144] and other noted Minnesota collectors were including the Lake Superior region in their field investigations, although most of their work was done elsewhere in the state.

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[142]C. J. Herrick (1955, p. 42); see also C. J. Herrick (1947, p. 178).

[143]C. L. Herrick, W. G. Tight, & H. L. Jones, Geology and lithology of Michipicoten Bay. Results of the summer laboratory session of 1886. *Bull. Sci. Lab. Denison Univ.* 2: 119–143 (1887). If any biological specimens were retained at Denison they were presumably lost in the 1905 fire which destroyed Barney Science Hall.

Joseph C. Arthur (1850–1942) collected in Minnesota during his early years in Iowa, and in 1886, immediately after receiving the first doctorate in botany granted by Cornell University, he left his job as botanist at the New York Agricultural Experiment Station and was "more formally opening up the botanic work" of the Minnesota survey.[145] Liberty Hyde Bailey (to be mentioned again in chapter 9), Warren Upham, and E. W. D. Holway (1853–1923) joined Arthur that summer in an investigation of all plants (including cryptogams) at Vermilion Lake and vicinity – the region between Lake Superior and the international border.[146] Bailey included a list of plants seen at Duluth in the report on the 1886 season, and Upham included a supplement to his 1884 flora in the report. The noted lichenologist Bruce Fink (1861–1927), while located in Iowa, worked several summers, beginning in 1896, for the geological and natural history survey of Minnesota. He made an extensive study of the lichens of the Minnesota portion of the Lake Superior shore in 1897 and referred in his report[147] to earlier work along the Ontario shore by Agassiz and by Macoun.

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[144]Edmund Perry Sheldon is the only botanist mentioned in this paragraph for whom biographical data are obscure. Upham & Dunlap (1912, p. 697) say he was born Sept. 25, 1863; *American Men of Science* ed. 2 (1910, p. 424) says he was born Aug. 9, 1869. Both agree that he was born in Bowling Green, Missouri, and that he graduated from the University of Minnesota in 1894. Maxine B. Clapp, Archivist, University of Minnesota, informs me (1977 & 1978) that the 1869 birth date is confirmed by her sources, that even the cohesive class of 1894 soon lost track of Sheldon, and that the date of his death is not recorded; he began an instructorship in botany at the University in 1894 and his resignation was accepted by the regents June 1, 1896. A brief biographical sketch, with a picture, is in *The Gopher*, the annual published by the junior class of the University of Minnesota (10: 103. 1896); it notes that he just returned from "a two months' study of eastern herbaria." After leaving Minnesota, he was a botanical explorer and forester in Oregon (*Am. Men Sci.*). Sheldon then went into law, being admitted to the bar in California on January 4, 1910; he was admitted temporarily as an attorney in Oregon in 1911, when he was living in Portland, but little other information about his legal career seems to be available (M. A. Gholston, Oregon State Bar, pers. comm. 1978). Sheldon's undergraduate fraternity was Theta Delta Chi, and their executive secretary reports to me (1978) that he died in 1913.

[145]Arthur (1887, p. 5). In 1887, Arthur went to Purdue University, where he remained for the rest of his life. Kern (*Phytopathology* 32: 833–844. 1942), among others, summarizes his distinguished career as a plant pathologist and includes a bibliography, but omits mention of the Minnesota work.

[146]See Arthur et al. (1887) and Rodgers (1949, pp. 111–113).

[147]Fink (1899).

Edmund P. Sheldon (1869–1913), who described an arrowhead and a sedge, *Sagittaria cuneata* and *Carex albursina*, as new species while he was still a student at the University of Minnesota. (From *The Gopher*; see footnote 144 above.)

N. H. Winchell had scarcely gotten settled in Minnesota before he proposed, in December of 1872, that a state scientific society be organized. Dr. Asa E. Johnson (1825–1906)[148] offered his office for the first meetings and was looked upon as the "founding father" of the Minnesota Academy of Natural Sciences, which was launched in January of 1873. Dr. Johnson was the first president, and most of the founding members were physicians. N. H. Winchell was the youngest charter member and one of the few non-medical ones, but he was the "most active, diligent and interested worker of all the members of the Academy" and served it as president 1879–1881, 1897, and 1898.[149] Louis Agassiz was an honorary member. Publication of a bulletin was begun the first year (1873). Soon, a museum was established, with specimens in cases "copied from similar cases in the museum of the University of Michigan"–but botanical specimens were not included at the first, although Dr. Johnson started reporting on the fungi of Minnesota in 1876 and Warren Upham on the vascular plants in 1882. In 1881, Clarence Luther Herrick was secretary of the Minnesota Academy, "the most northerly or northwesterly in the United States."[150] The Academy was active principally in the Twin Cities region, but like its homologous institution in Wisconsin, deserves mention for the early date of its establishment on the frontier of science in the Old Northwest.

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[148]On Asa Emery Johnson, see Gale in *Proc. Minn. Acad.* 4 (Bull. 3): 322–323 (1911).

[149]On the Minnesota Academy (which became simply the "Minnesota Academy of Science" on March 6, 1906), see its early bulletins, especially Gale (1911) and the memorial number for Winchell (5: 69–116. 1914).

[150]*Bull. Minn. Acad.* 2: 44 (1881).

Chapter 5.

LAKE SUPERIOR, NORTH OF GITCHE GUMEE

The south shore of Lake Superior was explored by the expeditions to the Mississippi already discussed—Indian legends recorded by Henry Rowe Schoolcraft even inspired Henry Wadsworth Longfellow (in *The Song of Hiawatha*). Early Wisconsin and Minnesota work included some study of the west end of that vast inland sea. But what of the Canadian shore? The first scientific exploring expedition to pass along it was in too great a hurry to accomplish much there. This was the second expedition conducted by Major Stephen H. Long, who had explored 1819–1820 west to the Rocky Mountains, examining the recent Louisiana Purchase. In 1823, Secretary of War Calhoun ordered Long to command an expedition to the St. Peter's [Minnesota] River and Lake Winnipeg.[151] Edwin James was supposed to accompany it (as he had Long's earlier expedition) as botanist, geologist, and physician, but he failed to receive his orders in time to connect with the party. Consequently, Thomas Say (1787–1834), who had also been on Long's first expedition and who was to serve as "zoologist and antiquary" on this one, undertook "to collect such plants as might appear to him interesting, but with that diffidence with which a man will attend to a task with which he does not profess to be conversant."[152]

Long's expedition left Philadelphia at the end of April in 1823 and traveled across Ohio to Fort Wayne, thence to Chicago and across Wisconsin Territory to the Mississippi. On the return trip, however, the route led via Lake of the Woods and Rainy Lake to Fort William [now included in Thunder Bay]. Kakabeka Falls, not far west of Fort William, was a collecting site. The expedition left Fort William September 15, in a leaky, flat-bottomed 30-foot sailboat and arrived at Fort Brady, at Sault Ste. Marie, 15 days later, on September 30.[153] This was a rapid trip along the north shore of Lake Superior, where the rocky coast impressed the travelers although Keating admitted: "Our visit to this coast was of too transient and hasty a nature to permit us to extend our observations."[154] In view of the "unusually boisterous and severe" season, which featured snow, hail, or rain as well as strong winds nearly the entire trip, it is remarkable that any observations were made at all! The accounts by Long and by Keating include only the most vague and general remarks on the vegetation of the Lake Superior region.

Thomas Nuttall was supposed to report on the plants collected by the expedition,

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[151]On Long and this expedition, see Keating (1924); Ewan (1950, p. 253); Meisel (1926, 2: 419–423); Stuckey (1970).

[152]Keating (1824, 1: 12). Thomas Say achieved fame primarily as a zoologist, especially as an entomologist; his botanical work in the Great Lakes region was so slight that a discussion of his interesting life is hardly relevant here. Ewan (1950, p. 298) cites some principal references; Weiss & Ziegler summarize this expedition (1931, ch. 6, pp. 92–105).

[153]Keating (1824, 2: 176). William H. Keating served the expedition as mineralogist and geologist, and also prepared the narrative after its return.

[154]Keating (1824, 2: 177).

but he did not return from a European trip in time to complete his work, so the botanical report was made by Rev. Lewis David von Schweinitz, one of the leading botanists of the Philadelphia region.[155] Schweinitz listed 130 species in all and for only four of them are any localities cited which are definitely in the Lake Superior region (although some others are said to range "to Lake Superior"): *Arbutus [Arctostaphylos] uva-ursi* (". . . shores of Lake Superior"); *Potentilla tridentata* and *Hudsonia ericoides* [undoubtedly actually *H. tomentosa*] ("Falls of Kakabeka"); and *Viburnum pubescens* ("Sault de St. Marie"). After a chance to visit with Schoolcraft and others at the Soo, the expedition left on October 3 and arrived at Mackinac Island the next day, where Long and his companions boarded a revenue cutter for Detroit. They reached Philadelphia October 26.

For the first serious botanical investigation of the Canadian shore,[156] we come to the great name of Louis Agassiz (1807–1873),[157] born in Switzerland of a long line of Protestant ministers, trained as a physician, but called to a career as teacher and naturalist (he became professor of natural history at Neuchâtel). He had exhausted the resources of his relatives and friends in Switzerland, who valiantly supported his scientific publications, when Alexander von Humboldt (whose friendship he had made in Paris) obtained for him a subsidy from the King of Prussia to make a scientific exploration in America. On his way to the United States, Agassiz visited his friend Sir Charles Lyell in England, who arranged for him to deliver a course of lectures at the Lowell Institute in Boston (where Lyell had earlier lectured). Agassiz arrived in the fall of 1846 and spent his first month traveling, accompanied on part of his tour by Asa Gray. He promptly impressed his colleagues with his breadth of knowledge as well as his good humor and charm and he became enormously popular. He was a gifted lecturer and people eagerly thronged to hear him. He accepted countless invitations to speak, in order to make enough money from lecturing to support his scientific work. In 1847 Abbott Lawrence sponsored Agassiz for a professorship in the Lawrence Scientific School, which he was endowing at Harvard; Agassiz could not be "Professor of Natural History," since that was Asa Gray's title, so he became "Professor of Zoology and Geology"—and he remained in America.

Agassiz's first teaching at Harvard began in the spring of 1848, but he continued his view that all people, not just professionals, could benefit from scientific instruction. Consequently, his ambitious "field trip" to the north shore of Lake Superior in 1848 included not only nine Harvard students (two from the law school) but also six other gentlemen: New York physicians, European naturalists, and two "cultivated Bostonians" including the chronicler of the expedition, J. Elliot Cabot.[158] One of the Harvard College seniors on the trip was Charles G. Loring, whose older sister, Jane, had just

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[155]Schweinitz (1824); see Stuckey (1970) for further botanical remarks.

[156]Perhaps the reference here should be to the first serious *and* extensive investigation, for a few specimens (particularly mosses) were collected along Lake Superior in 1825 by Thomas Drummond (?1790–1835) on Sir John Franklin's second overland polar expedition in British North America. The expedition left Penetanguishene, on Georgian Bay of Lake Huron, on April 23 by canoe and arrived at Fort William May 10. Hooker (1829–1840) credited many species to Upper Canada [Ontario] on the basis of collections by Drummond (and his fellow-naturalist, Dr. John Richardson), but few are specifically noted for Lake Huron or Lake Superior, and for fewer still is an explicit locality given. (*Dentaria laciniata* at Penetanguishene is one.) The season on Lake Superior would have been early for many collections. For a summary of Drummond's career, see Geiser (1948, pp. 55–78, references on p. 266); numerous references are also given by Stafleu & Cowan, *Taxonomic Literature* ed. 2, vol. 1 (*Reg. Veg.* 94. 1976), p. 685.

[157]Among many references on Jean Louis Rodolphe Agassiz, see Guyot (1886); Kelly & Burrage (1920, pp. 4–7); Lurie (1960). See also G. R. Agassiz (1913).

married Asa Gray on May 4, a little more than a month before the expedition left Boston. On February 10, the first edition of Gray's *Manual* had been published, and it is hardly surprising that Agassiz could say of the plants collected: "They were for the most part determined on the spot with the excellent work of my friend Prof. Asa Gray on the Botany of the Northern United States."[159] One can imagine young Charles Loring by the campfire on the wild Canadian shore keying down an unknown plant in the new book by his illustrious brother-in-law! Later editions of the *Manual* were to credit a number of species to Lake Superior on the basis of collections by Agassiz's party, for they were examined by Gray upon return of the expedition.[160]

The narrative of this trip, with its scientific reports including lists of plants (though without localities) and discussion of the vegetation (including comparisons with the Alps), proved to be popular and sales were considerable.[161] The party spent two weeks just getting from Boston to Sault Ste. Marie and making preparations, which included consultation with C. T. Jackson and J. W. Foster,[162] who were then surveying Michigan's mineral lands, and with officials of the Hudson's Bay Company, whose posts on the north shore proved hospitable. On June 30, accompanied by a dozen voyageurs to handle the paddling and camp chores, they left the Soo in one large Mackinaw boat and two 24-foot birchbark canoes. "Our canoe," wrote Cabot, "was distinguished by a frying-pan rising erect over the prow as figure-head, an importance very justly conferred on the culinary art in this wilderness, where nature provides nothing that can be eaten raw except blueberries." The expedition arrived back at the Soo on August 15—a month and a half later, having gone as far west as Thunder Bay and Kakabeka Falls. (Threatening weather had forced cancellation of plans for crossing to Isle Royale.) Agassiz's collections alone "occupied four barrels and twelve boxes, mostly of large size."

Clearly the next person to be mentioned is Canada's famed John Macoun (1831—1920),[163] born in Ireland, who emigrated in 1850 with his family to Ontario, where he taught public school in Belleville, becoming professor of natural history in Albert College in Belleville in 1868. He had early read Agassiz's *Lake Superior*, from which he "learned a great deal" and in the winter of 1868—1869 he read it again. Almost no botanical information had been recorded from the region in the meantime, and Macoun was asked to collect for them by two men of Montreal, including George Barnston (1800 1883), an officer of the Hudson's Bay Company, who had gotten

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158Cabot's cousin Elizabeth Cabot Cary and Louis Agassiz were married in 1850, Agassiz having learned upon returning from the Lake Superior expedition that his first wife had died of tuberculosis in Switzerland in July.

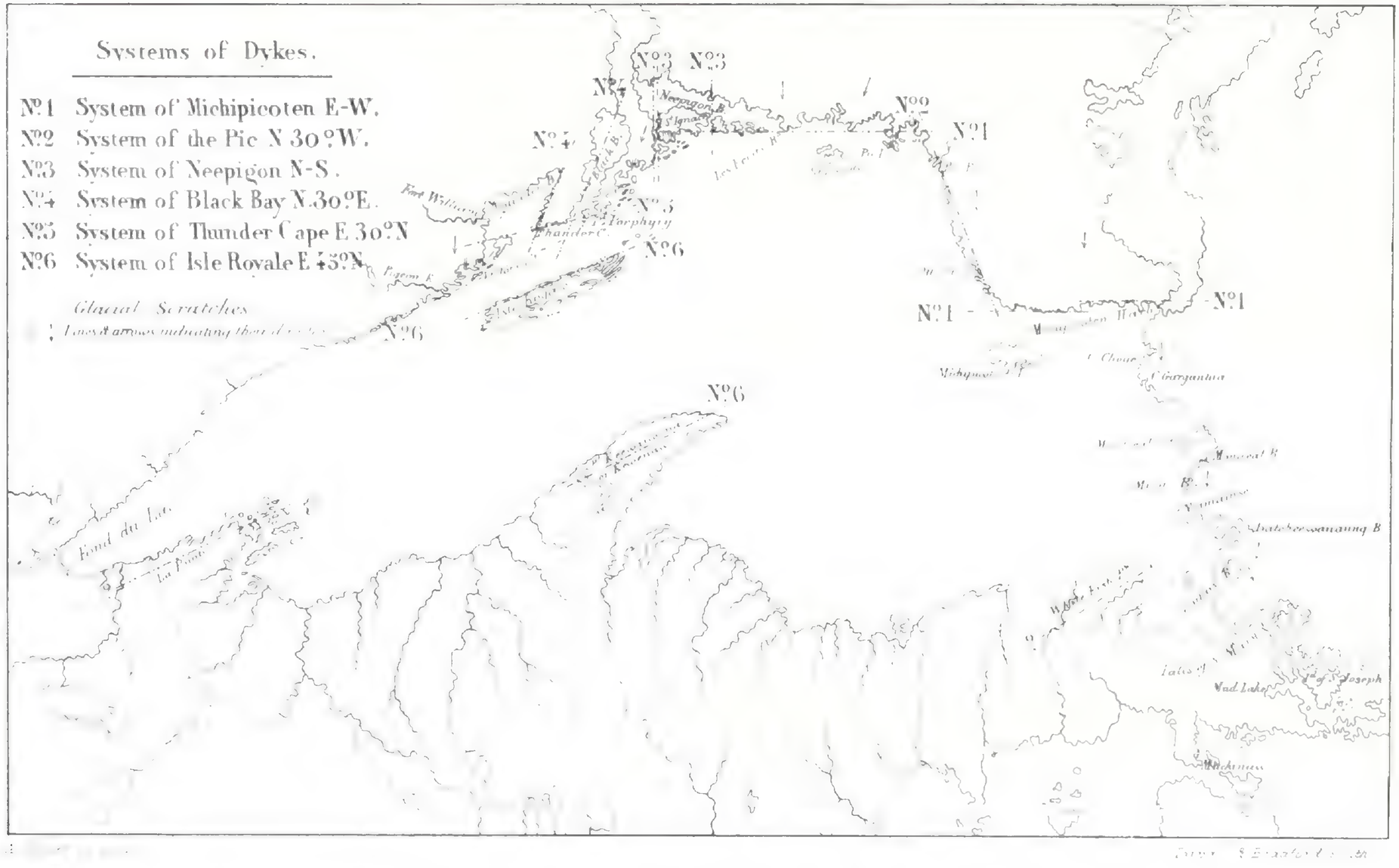
159L. Agassiz (1850, p. 154).

160Mosses, too, were collected, and were examined by Leo Lesquereux and W. S. Sullivant (see Rodgers 1940, p. 203); in the second edition of Gray's *Manual* (1856), Sullivant credits at least a dozen uncommon mosses to Lake Superior on the basis of collections by Agassiz or Loring.

161L. Agassiz (1850). Anyone who has experienced the black-flies and mosquitoes of the north shore, admired the grandeur of the scenery, viewed the terraces at Terrace Bay, or wished to know this area before road or railroad traversed it, will enjoy Cabot's narrative. For a remarkable blend of text and color photographs to convey the spirit of the north shore as the Indians knew it and the explorers saw it before it was soiled by "civilization," one should also pore over *Superior: The Haunted Shore* by Bruce Litteljohn & Wayland Drew (Gage Publ. Ltd., Toronto, 1975. 176 pp.)

162The Bostonians Jackson and Foster were already well known to Agassiz; see chapter 8, at notes 299 & 301.

163For a full account of his life, see Macoun's autobiography (1922); see also Rodgers (1944b, especially pp. 73–80, 210–214, & 300–303), based largely on the autobiography. In 1875, Macoun turned down an offer to teach school in Cheboygan, Michigan (Autobiography, p. 134)!



Map of Lake Superior, from Louis Agassiz (1850, facing p. 428).

some specimens on Lake Superior as early as 1860. Armed with letters of introduction to personnel of that Company, Macoun left for Lake Superior early in July of 1869 and spent nearly two months collecting and comparing his observations with those of his predecessor: "Agassiz placed the flora around as mostly subarctic, but I found that that statement only held close to the lake, while I found the plants a few hundred yards back from the lake almost identical with those north of Belleville. I saw the cause at once, the lake water according to Agassiz was 48°F. at midsummer and 120 miles of cold water accounted for the change in flora on its shores."[164] In 1872 Macoun again collected on the north shore, but more briefly for he was drafted en route by Sandford Fleming, chief engineer, to serve as botanist with his exploring party across the prairies to the Pacific, surveying a route for the railroad that had been promised to unite British Columbia with the rest of the new Confederation. (The Hudson's Bay Company territories had been purchased in 1869, while Macoun was on Lake Superior.)

Macoun received a permanent fulltime appointment to the Dominion government in 1882, as botanist with the Geological and Natural History Survey; five years later he was assistant director and naturalist for the survey. The government bought the flowering plants in his herbarium, which altogether included some 50,000 to 100,000 specimens. Almost every summer he was engaged in field work in some part of Canada, the geological survey being very broadminded about the conduct of such valuable scientific work. In the summer of 1884 Macoun returned to the north shore, walking almost 200 miles back from Ross Bay to Michipicoten along the route of the Canadian Pacific Railroad, which ranged at the time from a blazed path to various stages of construction. In his great *Catalogue of Canadian Plants,* published 1883–1902, numerous records from Lake Superior localities are cited by Macoun as a result of his own collecting efforts. Canada's great exploring botanist retired in 1912 and lived on Vancouver Island until his death.

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[164]Agassiz (1850, p. 124) actually gave the temperature as "about 40°," not 48°, as quoted by Macoun (1922, pp. 44–45).

Chapter 6.

LAKE SURVEYORS, AND OTHERS

Macoun's exploits with railroad surveys in western Canada, which cannot be discussed here but which brought him considerable fame and respect in that country, are reminiscent of the U.S. Pacific Railroad Surveys.[165] However, in the Great Lakes region, another kind of survey was important: surveys and mapping of the Lakes themselves—and this work commenced before the transcontinental railroad surveys. The first steamboat to arrive in Detroit was the historic *Walk-in-the-Water*, in August of 1818. The next year, she made the round trip from Detroit to Green Bay and back in 13 days. Until 1825 there was still only one steamboat west of Niagara, but by 1831 there was daily service to Detroit.[166] Aids to navigation, lighthouses, data on lake levels and weather, and standard charts became essential as commerce increased and cities and towns developed along the shores. A big task loomed: the five Great Lakes themselves cover some 95,000 square miles, and their total shoreline, including islands, is close to 10,000 miles (about equally divided between Canada and the United States).

When the U.S. Lake Survey (Survey of the Northern and Northwestern Lakes)[167] was established by Congress in the spring of 1841, the upper Lakes were still sparsely

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[165]On the history of these surveys and of the U.S. Corps of Topographical Engineers (1838–1863), which conducted them, see William H. Goetzmann, *Army Exploration in the American West 1803–1863* (Yale Univ. Press, New Haven, 1959. 509 pp. + maps). See also Meisel (1929, 3: 189–220).

[166]Farmer (1890, p. 909).

[167]For the history of the Lake Survey, see Comstock (1882, ch. 1, pp. 1–47: "Historical Account of the Survey of the Northern and Northwestern Lakes–May, 1841, to July, 1881"); the early days are briefly described in Farmer (1890, p. 918); there is some history on pp. 2122–2126 (followed by a rather confusing index to reports) of House Doc. vol. 20, 63rd Congress, 2nd Session (Doc. 6617. 1916). The basic history, of course, is in the annual reports of the Survey, which, like many Government documents, are bibliographically complicated. They were, in most years, appendices to the reports of the Chief of Engineers (before 1863, of the Topographical Engineers), which themselves were appended to the report of the Secretary of War, issued as a House or Senate Document (some years one, some years the other); separate issues, at least in some years, of the report of the Chief of Engineers lack identification as a Congressional document but fortunately bear the same pagination. Additional reprints of the Lake Survey report, in some years, were repaged beginning with p. 1. For simplicity in subsequent footnotes, the reports are merely identified by their year (whether calendar year or fiscal year ending June 30, as the case may be–it varies!) and the document serial number by which the original report can easily be found in libraries containing U.S. Congressional documents; the Engineers' reports or the separate Lake Survey reprints may be additionally cataloged by libraries, which may thus in fact have copies of a given year's report in at least three different places. Since the reports often were required to cover a fiscal year ending in the middle of a field season, the officer in charge was inclined to be annoyed by the inconvenience, and a report may be repetitive, or cover activities beyond the technical end of its period. There is no botanical information in these reports, but the full accounts of the activities of personnel are an invaluable source of biographical data and of itineraries of the several collectors who are discussed in this chapter.

The Lake Survey was originally headquartered in Buffalo, but the office was moved to Detroit soon after Col. James Kearney took charge in 1845. The Survey was conducted by the Chief of Topographical Engineers until that Corps was merged with the Corps of Engineers (also under the War Department) in March of 1863. In 1882, the surveys were considered completed, and the

populated, although settlers were pouring in rapidly and commerce, especially from Buffalo to Detroit and Chicago, was growing. (To reach Lake Superior, it was still necessary, until 1855, to portage past the rapids at Sault Ste. Marie.) There were few lighthouses or other aids to navigation and no official charts, so that pilots had to rely largely on their own hard-earned experience. Navigation on the Great Lakes was especially dangerous because storms could rival those on the ocean but ships dared not ride them out; shores were always too close. Yet, in 1841, a ship leaving Chicago had no refuge from storms on Lake Michigan until the Manitou or Beaver Islands were reached—and the situation on Lake Huron was similar. With a modest appropriation of $15,000, the Lake Survey began in 1841 the systematic charting of the Lakes—before the days of aerial photography and electric calculators (not to mention computers), so that every mile of shore was surveyed on foot, primary triangulation points were established in the rugged wilderness (as far as 100 miles apart across Lake Superior), and enormous calculations were made of astronomical data (based on hundreds of readings of stars to determine latitude and longitude precisely).[168]

In 1851, the major task of the Lake Survey really began; with larger appropriations, better instruments, improved methods, and more personnel, the work—previously confined largely to harbors—progressed. An officer of the Army Engineers was always in charge, but as activity expanded, more assistants were needed than could be spared from the Engineers and a greater number of civilian assistants were employed, being promoted to responsible positions as chiefs of parties after they had acquired experience. There were steamer parties responsible for taking soundings, for primary triangulation, and for moving parties from one place to another. In addition, there were shore parties engaged in gathering data for mapping, doing inshore hydrography and secondary triangulation. A shore party would consist of a chief, three or four assistants, and the requisite numbers of chainmen, leadsmen, and boatmen to assist the topographers, and crews for three or four six-oared boats. They had full camp equipment and established their camps on shore; after surveying for six or seven miles on either side of a camp, they moved to a new location. Sometimes as many as 200 men would be at work during the field season (May to October if appropriations were made in time). Several of these men were active plant collectors who, like the land surveyors, were in a position to label their specimens with some precision. A number of University of Michigan students were employed summers by the Lake Survey; alumni and non-graduates were among the civil assistants for varying periods. Those who collected plants were probably inspired in their botanical interests, at least in part, by Prof. Alexander Winchell, whose botany class was required in both the classical and the scientific (including engineering) courses at the University.

As early as 1861, N. H. Winchell acknowledged among the sources for his catalog of the flora of the Lower Peninsula of Michigan a "collection of plants made in the neighborhood of Fort Gratiot, near the foot of Lake Huron, by Mr. E. P. Austin,

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Lake Survey was suspended except for the issuance of charts. But appropriations for new surveys and correction of charts began in 1889 and the Survey resumed full operation in 1901. In 1970, it was transferred from the Army Engineers to the Department of Commerce and merged with the Coast and Geodetic Survey (with which it had often been confused!) to form the National Ocean Survey. In 1976, its functions and personnel were transferred from Detroit to Rockville, Maryland.

168Just as the final draft of this account was being completed, as if to emphasize the contrast, I was handed a photograph covering the area from Little Traverse Bay to Whitefish Point, taken by a NASA Landsat satellite from an altitude exceeding five miles; how incredulous the surveyors of over a century ago would be if they knew that such photos are now taken every nine days of every part of the terrain they so laboriously spent years covering!

Assistant on the Coast Survey of the lakes." Edward Payson Austin attended the literary department of the University of Michigan 1857–1859 (and was therefore in part a classmate of N. H. Winchell's) but he did not graduate.[169] He was an assistant engineer with the Lake Survey from 1859 until he was discharged August 21, 1863, for leaving his post (on northern Lake Michigan) without authority.[170] In 1859 he was assisting in the determination of the difference in longitude between Detroit and Fort Gratiot.[171] In 1860 he was engaged in astronomical computations, observed meteorological data at Sanilac, and was in a party on Lake Huron determining latitude and longitude of points on the Canadian shore.[172] His plant collections have not, so far as I recall, survived, and little more seems to be known about his natural history activities except that he developed a specialty in beetles.[173]

The collector whose name is most frequently encountered among the Lake Survey personnel was Henry Gillman (1833–1915).[174] A scholar of broad interests, he was born in Ireland and came to Detroit with his parents in 1850–the same year that John Macoun emigrated to Ontario with his family. From 1851 to 1869 he was an assistant engineer with the Lake Survey, often in charge of shore parties. From 1870 to 1876, he was assistant superintendent of construction for lighthouses on the Great Lakes, and thus continued to travel along the shores. He then moved with his family to Florida[175]

169Sensemann (1923, p. 606 Austin is listed as a sophomore in the scientific course in the 1857–1858 University of Mich gan catalog and directory, and the following year is listed among "Students in Select Courses"--not in any class; his residence is given as Ann Arbor both years. Merrill (1920, p. 208), listing him as a volunteer collector in entomology for Winchell's survey, said he was "of Lake Suney" but this was presumably an error in transcription for "Lake Survey" as no "Lake Suney" is listed in gazetteers.

170Lake Survey Report 1863 (Doc. 1184, p. 187).

171Lake Survey Report 1859 (Doc. 1024, p. 711).

172Lake Survey Report 1860 (Doc. 1079, pp. 304, 317, 385); Comstock (1882, p. 13).

173Around 1867, Austin was associated with the office of the Nautical Almanac in Washington, D.C.; he was assistant in the observatory at Harvard University 1868–1871 but he obtained no degree at Harvard (*Quinquennial Catalogue of the Officers and Graduates 1636–1895*–and other years). He is listed in an 1873 directory of botanists (*Bull. Torrey Bot. Club* 4: 49 & 56) as living in Washington, D.C., and specializing in Michigan; a supplement to that directory (*ibid.* 6: 104. 1876) lists him at Cambridge, Mass., and not active. He published at least one paper on astronomy, in 1878, and a number of papers on beetles, including his presidential address for the Cambridge Entomological Club (*Psyche* 2: 217–223. 1879). Gifts from Austin of seeds of wild plants were acknowledged in the 1867 and 1868 reports of Alexander Winchell on operations of the University of Michigan Museum, and he also gave some insects and other specimens to the Museum 1866–1868. In 1889 the Austin collection of beetles was acquired by Michigan State University. By then, Austin had moved west, where he devoted himself to real estate and mining; correspondence with Samuel Henshaw about the sale of his collections, which were stored in Cambridge, is in the archives of the Museum of Comparative Zoology at Harvard, I am advised in an informative letter (1978) from Ann Blum, archives assistant.

174The longest account of Gillman, with a small picture, is in *Natl. Cycl. Am. Biogr.* 7: 359–360 (1892); see also Krum in *Dict. Am. Biogr.* 7: 294–295 (1931) and the first 8 eds. of *Who's Who in America.* Gillman's name is perpetuated nomenclaturally with at least three plants: A liverwort, published as *Jungermannia gillmani* C. F. Austin (*Bull. Torrey Bot. Club* 3: 12. 1872), was collected by him in a cave on Au Train Island, Alger County, Mich., in 1867–evidently the first record of a liverwort collected in Michigan, and a new species at that! (See *Bryologist* 38: 83. 1935.) A goldenrod was named for him by Asa Gray as *Solidago humilis* var. *gillmani* (*Proc. Am. Acad.* 17: 191. 1882), without specific collection data, which were later provided in a thorough discussion by E. S. Steele (*Contr. U.S. Natl. Herb.* 13: 367–369. 1911). Gillman himself (in J. U. & C. G. Lloyd, *Drugs Medic. N. Am.* 1: 235. 1885) proposed the name *Actaea neglecta* for what is now usually recognized as a white-fruited form of the red baneberry, *A. rubra.*

175Engelmann (*Trans. Acad. Sci. St. Louis* 3: 591. 1877) referred to "Mr. H. Gillman–late of Detroit, now in Waldo, Florida–who has very attentively studied the Flora of the Upper Lake country . . ."

until 1878 (the year that his wife died). In 1880 he became librarian of the Detroit Public Library, charged with its improvement; when he left that post in 1885, the library had grown from about 40,000 volumes to about 60,000. He then served for five years as U.S. consul in Jerusalem and while there managed to procure for publication photographic facsimiles of some early Christian manuscripts, including the *Didache.* After his retirement from diplomatic service in 1891, he resided in Detroit when not traveling. He published a volume of poetry in 1863, during his Lake Survey career, and a volume on the wildflowers and gardens of Palestine in 1894. He did considerable archeological research in Michigan in the 1870's and published a long series of papers on that subject, especially on Indian mounds and Isle Royale mines. According to one of his biographers, he "was one of the first to emphasize the importance of Isle Royale as a field for scientific investigation."[176]

Gillman's plant collections are usually adequately labeled and the ones I have seen date from 1864 (only a few)—well after he began his Lake Survey work—through 1876, his last year supervising lighthouse construction. He was often in parties on the Straits of Mackinac and Lake Huron in the 1850's, on northern Lake Michigan (Benzie to Grand Traverse counties) in 1860, and on Lake Superior in 1861 (as was E. P. Austin), but Gillman seems not to have developed an interest in botany at that time. The survey of Green Bay commenced in 1862, and Henry Gillman was placed in charge of a shore party there in 1863, aided by Lewis Foote. In 1864 he collected (sparsely) on Lake Superior while surveying at Keweenaw Bay, Copper Harbor, and Torch Lake; and in 1865 he was in charge of a shore party, again aided by Foote, between Eagle River and Ontonagon. This party left Detroit May 20, 1865, and returned October 3; the site of their activity was described by their superior: "The field assigned to this party is . . . without inhabitants, and where the party was for the whole season almost cut off from communication. Occasionally a passing Indian brought them their mails in his canoe . . ."[177] The next season, 1866, Gillman and his party sailed from Detroit on May 25 for Whitefish Bay, on the Door Peninsula of Wisconsin, but in 1867 he was back on Lake Superior (leaving June 7) in charge of a topographic and hydrographic party assigned to survey from Grand Island, near Munising, westward toward Marquette—until transferred in August to the Keweenaw Peninsula to work on grading and preparing for measurement the Keweenaw base line south of Portage Entry. Another portion of the south shore of Lake Superior, from Ontonagon westward into Wisconsin, was covered by Gillman in 1868, the party leaving Detroit May 16. He resigned from the Lake Survey before the field season of 1869,[178] and I do not know what he did that summer (he collected at Detroit in

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[176]Krum in *Dict. Am. Biogr.*

[177]Major W. F. Raynolds, Lake Survey Report 1866 (Doc. 1285, p. 459); Gillman had assisted then Lt. Raynolds from the south shore of the Straits of Mackinac to Little Traverse Bay in 1853. Information on Gillman's itineraries in this paragraph comes from the Lake Survey reports, from Comstock (1882), and from localities on specimen labels.

[178]Lake Survey Report 1869 (Doc. 1413, p. 558). Lt. Col. W. F. Raynolds, who was in charge of the Survey, in the same year (p. 543) noted frankly, in his final report before being relieved, the situation which presumably led to Gillman's resignation. During the Civil War no military personnel except the officer in charge were assigned to the Survey (see also Comstock 1882, pp. 14–15). "All the parties were, therefore, under the charge of old and experienced civil assistants. When the war ended officers fresh from the Academy were ordered to report to me," wrote Raynolds. "Their commissions entitled them to the command of parties, while they lacked the experience which such command implied. The desire of the [War] Department to make the survey 'a school of instruction' for young officers of the corps has caused such frequent changes that, within the past five years, fourteen different officers have been assigned to duty on the survey, whose average

October). Plants collected by him on Isle Royale, during his "lighthouse period," date from 1872, 1873, and 1874; there are other collections from Lakes Huron, Michigan, and Superior 1871–1876, and in 1870 from Detroit and Fort Gratiot.

Gillman's herbarium went to Princeton University and was deposited, with other Princeton collections, in the New York Botanical Garden in 1945. He corresponded and exchanged with many botanists, so his collections are in other herbaria as well.[179] Among his several short papers on Michigan plants was one on Lemnaceae (duckweeds), reporting *Lemna minor* flowering at Eaton Rapids, Michigan, June 7, 1870, and *Wolffia columbiana* flowering in the Detroit River August 28, 1870.[180] In another short note, he listed several localities on the three upper Lakes where he had found a reportedly uncommon liverwort.[181]

Another very active engineer-botanist was Lewis Foote (1838–1925),[182] from the state of New York, who entered the University of Michigan in 1861. In the summer of 1863 he assisted Henry Gillman's party on Green Bay and collected on the Door Peninsula in June and July. He accepted permanent appointment with the Lake Survey as an assistant engineer in 1864 and had to leave school about ten days before final examinations began on June 22; he was not able to return to Ann Arbor for his exams and conferring of his degree (C.E.) until 1866. In 1864 he was again around the Door Peninsula, but in 1865 was back with Gillman, on Lake Superior. In 1866 they were both on Green Bay and the west shore of Lake Michigan again. Foote's earliest collections date from his student days (1862) or before,[183] and it is easy to imagine that it was he who interested Gillman in collecting. Foote left the Lake Survey because of failing health in 1874, evidently before the field season. He was in business in Detroit for a year or two and surveyed near Kingston, Ontario, in 1877, before moving

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length of service on the work, when I was relieved, did not exceed one and a half seasons in the field. The result has been the discontent and resignation of a large proportion of the civil employés."

[179]In a letter to Miss Mary Clark of Ann Arbor, April 11, 1867 (University of Michigan Herbarium, Allmendinger papers), Gillman stated: "The habitat of Lygodium palmatum I wrote you of, is near Concord, Mass., discovered by the late Henry D. Thoreau–*that high-priest of nature.* (You must have read his '*Walden*'!) The location is now kept secret by two or three of his friends; but I have been promised specimens from one of them, the ensuing season, and when I receive them you shall be remembered. . . . *Platanthera obtusata* I collected last season at *'The Portage,'* between Lake Michigan & Green Bay, where the Canal is to be made soon.–It is rather scarce; & my stock is exhausted from numerous demands."

[180]Gillman (1870). Gillman published several later notes on flowering Lemnaceae, a subject which evidently interested him. Engelmann commented on flowering material of *Spirodela* supplied by Gillman from Detroit in *Bull. Torrey Bot. Club* 2: 34 (1871).

[181]Gillman (1876).

[182]In addition to Lake Survey reports, information about Lewis Foote is in the Alumni Records Office, University of Michigan, and in an unpublished manuscript in the files of the University of Michigan Herbarium, written in 1958 by R. Elda Evans, "Biography and Travels of Lewis Foote." A concise paragraph summarizing Foote's career as "Civil Eng. and Botanist" appeared annually beginning in 1908, in the announcement, catalog, and register of alumni of the University of Michigan Department of Engineering (Univ. Mich. Bull. n.s. 9(13): 168. June 1908–and later years).

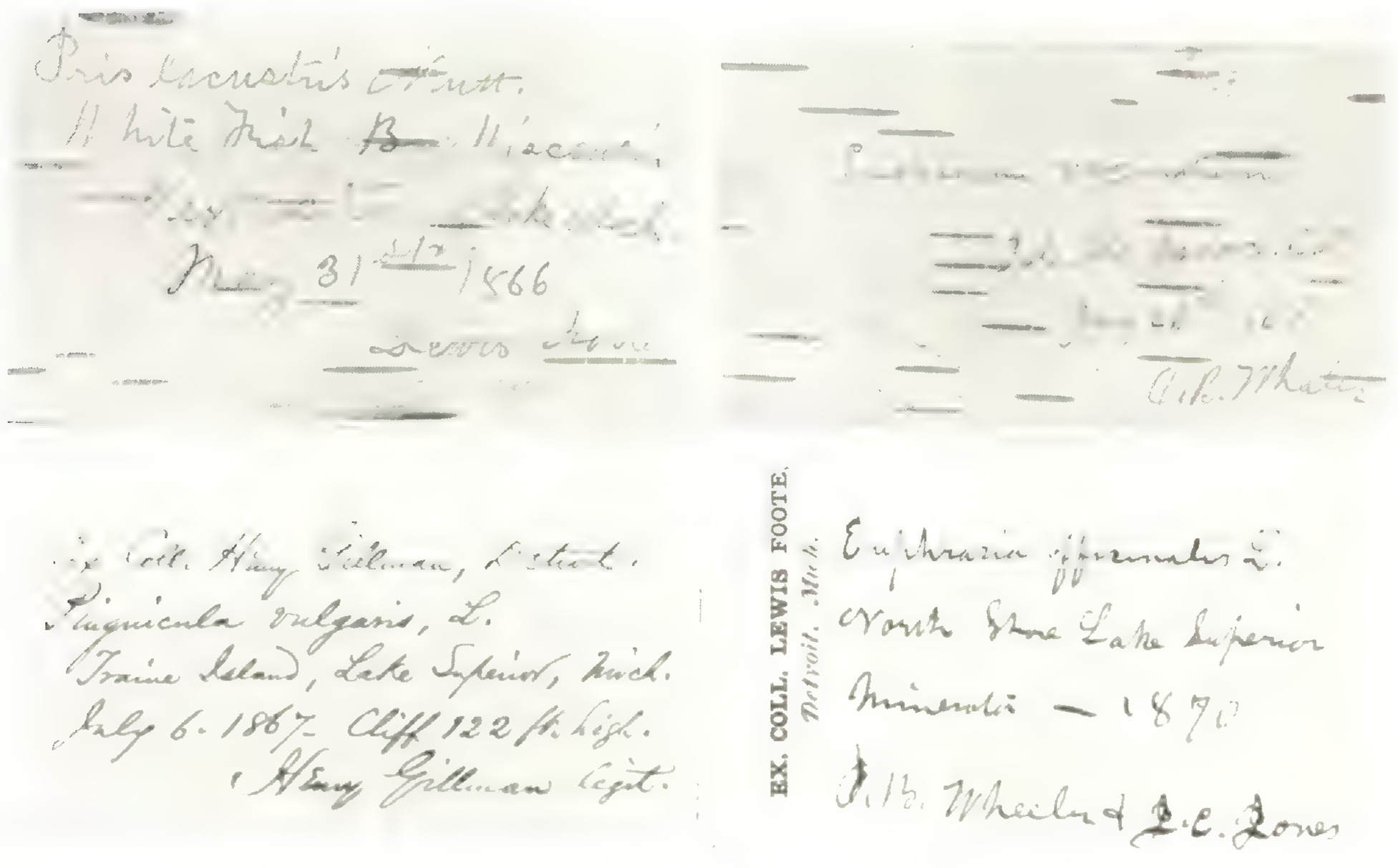
[183]Foote's album of neatly mounted "Flowers Analyzed in 1862" (April–August) looks like the result of a botany course at the University, although botany was then offered in the junior year (which was the same as the second year of the engineering course and hence 1862–1863 for Foote). All the specimens are from Ann Arbor, precisely dated, and a few are credited to Miss Mary H. Clark (see next chapter). However, in the University of Michigan Herbarium there is also a similar album of Foote's specimens from Norwich, N.Y. (his home at the time he attended the University), and Cazenovia, N.Y., without dates but probably even earlier.

westward with his wife. He farmed and led a quiet life in Minnesota, Kansas, and Iowa, living almost until his 87th birthday. In 1903 he presented to his alma mater two thousand specimens collected mostly during the decade that he was mapping the shorelines and otherwise working for the Lake Survey.

One of the interesting features of many of Foote's collections is that the original labels are written on neat rectangles of birchbark. These look as if they had been prepared in the field from emergency sources, but it is more likely that they were written picturesquely after he returned; the existence of birchbark labels in Foote's hand for collections made by another surveyor, O. B. Wheeler, on another lake from Foote's location at the time, strongly suggests that the labels were not prepared in the field, despite their rustic appearance.[184]

In 1867, Foote was at St. Clair flats in June and was then transferred to Sault Ste. Marie, for measurement of river flow, being transferred again in August to the Niagara River. He continued study of outflow on the Niagara River in 1868 and 1869 (including amount of water going over the falls), but in 1870 and 1871 he was in the field on Lake Michigan. (In 1870 he stayed in Detroit until the end of July, when the appropriations bill was finally passed and parties could be sent out.) Smoke from the severe fires on both sides of Lake Michigan (the great forest fires in Michigan and

[184]See note 223 below.


Iris lacustris Pursh.
White Fish Bay Wisconsin
May 31st 1866
Lewis Foote
Isle Coll. Hwy Gillman, Detroit.
Fragicula vulgaris, L.
Traine Island, Lake Superior, Mich.
July 6. 1867. Cliff 122 ft. high.
Henry Gillman Collr.
EX. COLL. LEWIS FOOTE,
Euphrasia officinalis L.
North Shore Lake Superior
Minnesota — 1870
O. B. Wheeler & J. C. Jones

Labels from specimens collected by personnel of the U.S. Lake Survey (all slightly reduced). *Above*: Two labels in Lewis Foote's hand, on characteristic pieces of birchbark; at left, for a collection of *Iris lacustris* by himself at Whitefish Bay, Wisconsin, May 31, 1866 (the same day that Henry Gillman collected the same species at the same place); at right, for a collection by O. B. Wheeler at Isle St. Ignace, Canada West [Ontario], where Wheeler collected extensively in 1866 and 1867. *Below*: at left, a label of Henry Gillman's in his own hand, for a collection from Au Train Island, Alger County, Michigan, in 1867; at right, a label written by Lewis Foote for a specimen collected by O. B. Wheeler and J. C. Jones in 1870, presumably near Farquhar's Knob, Cook County, Minnesota (see footnotes 203–206).

Wisconsin, as well as the Chicago fire) so reduced visibility in 1871 that the shore parties were unable to accomplish their surveying and were withdrawn early in October.[185] In 1872 and 1873, his last seasons with the Lake Survey, Foote headed a triangulation party on the St. Lawrence River, but he seems to have done no collecting in these years.

It remains only to note that in the party under Foote's charge on the east shore of Lake Michigan May 15 to October 4, 1871, he had as one of his assistants V. M. Spalding. He expressed his gratitude to Spalding and three others "for the ability and cheerful perseverance with which they did everything required of them."[186] Foote and others suffered from bad health that season, and the helpful young assistant was Volney M. Spalding (1849–1918), who had then just completed his sophomore year at the University of Michigan–where he was later professor of botany and also offered the first full-fledged course in forestry to be given in the United States.[187] In a triangulation party on Lake Superior in 1872, Spalding assisted G. A. Marr, who wrote: "...left my recorder, Mr. V. M. Spalding, (who had had one season's experience on the survey), at Vulcan station [near the end of the Keweenaw Peninsula].... He was landed at Copper Harbor July 4.... Much is due the extra efforts of Mr. Spalding," resulting in successful readings under unfavorable conditions.[188]

One of the most eminent of the surveyors was O. B. Wheeler (1835–1896),[189] a native of Washtenaw County, Michigan, who entered the University of Michigan in 1856, took both classical and scientific courses, and received both an A.B. and a B.S. in 1862 and an M.A. and an M.S. in 1865. He was a classmate of N. H. Winchell and doubtless knew E. P. Austin and Lewis Foote on campus. During his senior year and for the summer (1862) after graduation, he was assistant to Prof. F. F. E. Brünnow in the new University observatory. In August of 1862 he became an assistant engineer with the Lake Survey, and except for two years away he remained with the Survey until its close in the summer of 1882.[190] He received the honorary degree of Civil Engineer from the University of Michigan in 1879. Like a number of the former Lake Survey personnel who had transferred to the Mississippi River Commission, Wheeler became an assistant engineer on that Commission in 1884 and was located in St. Louis, Missouri. He served as a member of various U.S. surveying and astronomical expedi-

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185Lake Survey Report 1872 (Doc. 1559, p. 1031).

186Lake Survey Report 1872 (Doc. 1559, pp. 1104–1106).

187See Rodgers (1851, p. 46) and Dana (1953, pp. xii, 1–8). Volney Morgan Spalding (A.B. University of Michigan 1873; Ph.D. University of Leipzig 1894) was one of the "greats" in the history of botany in Ann Arbor, but he was not noted as a field collector and I resist the temptation to say more of him in this account. I can recall seeing no collections which might have been made during his Lake Survey employment. Botany was at that time in the second semester program of the freshman year at the University of Michigan (along with Latin, Greek, and mathematics), so Spalding would presumably already have had Alexander Winchell's course; but possibly he was further encouraged in his botanical interests by Lewis Foote. And perhaps he was even spurred to an interest in forestry while surrounded on Lake Michigan by the immense fires of 1871–when almost four million acres burned in Michigan and Wisconsin, along with the city of Chicago.

188Lake Survey Report 1873 (Doc. 1598, p. 1182).

189Information on Orlando Belina Wheeler is in Chase (1880, p. 76); *Applet. Cycl. Am. Biogr.* 6: 454 (1889); an obituary in *Mich. Alumnus* 3: 44–45 (1896); and the files of the Alumni Records Office, University of Michigan–as well as in the reports of the Lake Survey.

190Comstock (1882, pp. v & 45).

tions here and abroad (including observations of the transit of Venus in 1874 and 1882 and the total solar eclipse in 1878).

Wheeler's plant collections are mostly from the north shore of Lake Superior in the United States and "Canada West" (as it was then known), although his assignments in the field were more widespread. His specimens are not as numerous nor as well labeled as those of Gillman and Foote–but I do not know what became of the personal herbarium he presumably had, having seen only specimens distributed to others. His chief work with the Lake Survey was in primary triangulation, astronomical observations with much detailed computation of latitude and longitude, and office work organizing ("reducing") field data.[191]

In 1863, the second season of work on Green Bay, E. P. Austin headed one section and O. B. Wheeler assisted the other section of an astronomical party determining latitude and longitude of points in and near Green Bay, South Manitou Island, and Beaver Island. After Austin was discharged, Wheeler was transferred to take over his section.[192] In 1864, he was again on Lake Michigan except for making determinations of latitude at Copper Harbor and Portage Entry on Lake Superior. Wheeler and S. W. Robinson were in charge, in 1865, of astronomical work on Green Bay, where they invented the heliograph as a modification of the "heliotrope" (which was used in long-distance surveying). By cutting off the light from the heliotrope in such a way as to make long and short flashes of sunlight corresponding to the Morse code, telegraphic messages could be sent by mirrors long distances–over 90 miles, as usefully demonstrated later on Lake Superior.[193]

Until being transferred to Lake Michigan September 27, Wheeler in 1866 was assigned to triangulation work on Lake Superior, where a very large triangle was to be established between the tip of the Keweenaw Peninsula (Vulcan station), Isle St. Ignace (almost due north, along the Ontario shore), and–a hundred miles away–a third point on the northeast shore (ultimately located at Tip Top Mt.). He was located on Isle St. Ignace from late June until, apparently, some time in August.[194] Isle St. Ignace became one of the principal collecting sites of his career, perhaps because the party waited over a month for favorable conditions to read angles, without success. With better (borrowed) instruments, the required angles were read in 1867. The parties planned for astronomical and triangulation work on Lake Superior in 1868 did not receive their expected new instruments in time, so were diverted to the lower Lakes, where Wheeler helped with observations between Detroit and Ogdensburg, New York.

The season of 1869 was the first (and only) one in which the entire Lake Survey force was confined to Lake Superior. O. B. Wheeler succeeded Henry Gillman as "principal assistant,"[195] but continued triangulation work rather than participating in the shore parties both that year and in 1870. In 1869 he was at the triangulation station on Michipicoten Island in northeastern Lake Superior, where he collected and where he was aided by D. H. Rhodes,[196] who also made some collections which

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[191]The last report of the Survey (1882) stated that "computing machines" had been used in the office, but did not say for how long; they were bulky, non-electric devices and those users who evaluated them did not include Wheeler, whose computational feats must have been performed with nothing more sophisticated than logarithms. (See Doc. 2094, pp. 2786–2790.)

[192]Lake Survey Report 1863 (Doc. 1184, p. 187).

[193]Lake Survey Report 1867 (Doc. 1325, p. 564); Comstock (1882, pp. 18 & 318).

[194]Lake Survey Report 1867 (Doc. 1325, pp. 567, 583–584).

[195]Lake Survey Report 1869 (Doc. 1413, p. 66).

Scene on Isle St. Ignace, north shore of Lake Superior (see map, p. 43). (From L. Agassiz 1850, facing p. 78.)

passed to Lewis Foote's herbarium, with which they came to the University of Michigan. The weather was considered very unfavorable in 1869; Lt. Col. Raynolds considered the season to be "by far the worst for field parties ever known in the history of the survey."[197] As the officer in charge of the Survey, Raynolds seemed particularly sensitive to the difficulties encountered by the field parties, having written of the 1868 season:

> The whole survey of this portion of the lake, extending from Duluth to opposite the western end of Isle Royale, was attended with privations and difficulties not met with in more favored localities; the almost entire want of communication, the absence of harbors, and to a great extent of even boat landings, the rough mountainous country covered by a dense forest, all combined to render the operations of the survey not only difficult, but dangerous, and I cannot but rejoice that the work has been finished successfully without an accident.[198]

Beginning in 1871, Wheeler evidently spent even more of his time than previously in office work. In that year, a vacancy having occurred in the meteorology department of

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[196]Lake Survey Report 1870 (Doc. 1447, pp. 552–553). Daniel Harker Rhodes (1838–1920) received the C. E. degree from the University of Michigan in 1869 and was evidently a summer employee of the Lake Survey immediately afterwards. Most of the rest of his life he was a civil engineer with railroad companies, in Michigan 1869–1872 and farther west in later years, responsible for the construction of thousands of miles of main line railroads. (See annual announcement, catalog, and register of alumni of the University of Michigan Department of Engineering [Univ. Mich. Bull. n.s. 9(13): 172 (June 1908–and other years)]; and obituary in *Mich. Alumnus* 27: 324. 1921.)

[197]Lake Survey Report 1869 (Doc. 1413, p. 560); see also 1870 report (p. 543).

[198]Lake Survey Report 1869 (Doc. 1413, p. 552).

the Survey, he was instructed to take charge of its computations and to inspect the accuracy with which observations were being made; he also "had other duties to perform, being in charge of the computing department of the Lake Survey, and having also an unforeseen amount of astronomical observations to make during the summer . . ."[199] Wheeler, who was by then one of the engineers longest employed by the Survey, was in charge of the reduction of water-level and meteorological observations from March of 1871 to July of 1878 (after which he was temporarily assigned to determine the Mexico-Guatemala border), in addition to his work of "computations for the adjustment of the primary and secondary triangulation, and for the geodetic positions of the points of triangulation" as well as preparing data required by the draftsmen in drawing final charts.[200] It is no wonder that he apparently did little field work or collecting after 1870! (Perhaps he lost interest, too, after Gillman and Foote—who may have gotten him started—left the Lake Survey.)

We come next to the name of J. C. Jones (1841–1897),[201] for some time a mystery on herbarium labels, for his later life was not devoted to science or engineering. He was born in Adrian, Michigan, and entered the University of Michigan in the fall of 1865. After one semester, he left for studies at Meadville Theological School (at that time in Pennsylvania), where he remained until June of 1867. He then became principal at Houghton School and after a year was transferred to the principalship of Tappan School (which he organized), both in Detroit.[202] He re-entered the University in the fall of 1869 and graduated with an A.B. degree in 1872. During the summer vacations of 1870 and 1871 he was employed as a recorder and observer by the Lake Survey and was stationed on Lake Superior. The Survey steamer *Search* left Detroit June 7, 1870, and returned October 17 after a full season engaged in primary triangulation of Lake Superior. O. B. Wheeler and his party were landed June 12 "near Farquhar's Knob."[203] "Owing to severe illness, Mr. O. B. Wheeler was compelled to leave the field, and after the 24th of September the

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[199]Lake Survey Report 1871 (Doc. 1504, p. 1008).

[200]Comstock (1882, pp. 24–25).

[201]Information on Joseph Comstock Jones is in the files of the Alumni Records Office, University of Michigan, including the letter on which the account in Chase (1880, p. 125) is based, and in an obituary in *Mich. Alumnus* 3: 198 (1897). He is also mentioned (see pp. 31, 34, 35, & 37) in a volume by his daughter, a distinguished civic leader, long interested in history, Sarah Van Hoosen Jones (*Chronicle of Van Hoosen Centenary Farm,* 236 pp.), privately published in 1969, three years before the death of Miss Jones, who received a Ph.D. from the University of Wisconsin in 1921 and returned to Rochester, Michigan, to farm in the best modern manner. Her mother, who had taught in the Saginaw schools, and Mr. Jones were married in 1889, two years after the first Mrs. Jones died expressing the deathbed wish that her husband marry Alice Van Hoosen. Daughter Sarah was scarcely five when her father died.

[202]Letter from J. C. Jones to T. R. Chase, dated January 17, 1878 [*sic*, for 1879] in Alumni Records Office.

[203]Farquhar's Knob, where a triangulation site was selected and station built in 1868, was not the promontory now known as Farquhar Peak. It is shown on the Lake Survey chart (Lake Superior No. 3), published in 1873, as being a little west of due north from Hovland, Minnesota (Farquhar Peak, on the other hand, is about 3 mi. northeast of Hovland); furthermore, the altitude of Farquhar's Knob, given on the chart as 1111 feet (above Lake Superior) and in Comstock (1882, p. 315) as 1113.3 feet, is much too high for Farquhar Peak which is at most 652 feet above Lake Superior according to the topographic map (Farquhar Peak Quadrangle, U.S. Geol. Surv., 1960). The same topographic quadrangle shows no triangulation station on Farquhar Peak, while there is one 3½ miles west, just a half-mile east of the Hovland lookout tower and just above the 1700-foot contour, which would be exactly right for "Farquhar's Knob." (Capt. Francis U. Farquhar, for whom these features are named, was in command of the Lake Survey steamer *Search* in 1867 and 1868, when its party was establishing triangulation stations on Lake Superior.)

remaining work at his station was performed by the recorder, Mr. J. C. Jones. It is due to Mr. Jones, as well as to the other recorders . . . to state that they proved themselves amply qualified for positions of far greater trust and responsibility."[204]

Alexander Winchell's report on the University of Michigan Museum for 1870 states that J. C. Jones '72 presented a collection "of about 200 species (500 specimens) of unnamed plants from Farquhar's Point, Minn., on the north shore of Lake Superior, about ten miles from the mouth of Pigeon river."[205] Jones' specimens of none of the four species specifically mentioned by Winchell, including *Ranunculus lapponicus* "never before discovered in the United States," can now be found in the University of Michigan Herbarium, but other species include two which are not otherwise known from Minnesota (although both are on Isle Royale): the rare fern *Cryptogramma crispa* and a disjunct species of sweet cicely, *Osmorhiza chilensis.* Jones evidently sent at least one specimen of the little Lappland buttercup, *Ranunculus lapponicus,* directly to Asa Gray, who originally described it as a new species of anemone, *A. nudicaulis,* noting: "All I know of it is from a specimen sent to me in a letter, dated August 8, 1870, from Mr. Joseph C. Jones, then of the U.S. Steamer *Search.*"[206]

Some of Jones' specimens now in the University of Michigan Herbarium are labeled in the hand of Mark W. Harrington and some in the hand of John F. Eastwood,[207] who was employed as an assistant in the museum in 1871, when Harrington left for Alaska. Presumably the numerous duplicates were distributed similarly labeled, with scanty or even erroneous data: sometimes no year, sometimes the year given as 1869; the collector sometimes (by Harrington) identified as "Prof. J. C. Jones" and sometimes with an "M.D." after his name—both unwarranted appellations for a student in the class of 1872. I have seen herbarium specimens collected by O. B. Wheeler himself in addition to those of Jones from 1870, and sometimes there are specimens from the herbarium of Lewis Foote labeled in Foote's hand as collected by "O. B. Wheeler & J. C. Jones"; these are simply attributed to "North Shore Lake Superior Minnesota" but are presumably all from Cook County.

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[204] Lake Survey Report 1871 (Doc. 1504, p. 994).

[205] *Report of Operations in the Museum . . .* for the Year Ending Sept. 19th, 1871, p. 11 (Univ. Mich. Regents Proc. p. 148). The distance cited from Pigeon River would (depending on route taken) be roughly 15 miles from Farquhar's Knob. No map or other record has been found which indicates a "Farquhar's Point." I suspect, if the plants were unnamed (and unlabeled), they were accompanied at best with a scrap of paper or an oral statement of their origin, which erroneously was interpreted as to exact name and distance. The specimens include species as diverse in their requirements as *Hippuris vulgaris* (an aquatic), *Rubus pubescens,* and *Cryptogramma crispa (acrostichoides),* so it is clear that they were not *all* collected on a rocky summit! They probably came from various points between the landing site on the shore and the highest elevation. (See also next note.)

[206] *Bot. Gaz.* 11: 17 (1886); the letter was also quoted, with minor errors in transcription, by Upham (1887, p. 46). I am informed (1978) by E. A. Shaw of the Gray Herbarium that the original letter is not now in the Gray correspondence there. The "Sand bay" where the plant was collected has eluded Minnesota botanists (see Butters & Abbe in *Rhodora* 55: 150. 1953). It shows on no maps, including the 1873 Lake Survey chart, which names only Horseshoe Bay in the vicinity of Hovland (and which does name Hovland, mysteriously not mentioned by name in the Lake Survey documents). Comstock (1882, p. 315) in describing Farquhar's Knob states: "This station is situated on the north shore of Lake Superior, and is about 4 miles northwest of Sand Bay, whence the trail leading to the station starts." The present road from Hovland to the site of Farquhar's Knob (see previous note) quite likely follows an old trail—and the distance would be about four miles. "Sand Bay" would therefore be the present Chicago Bay, or at least very near it. In view of the several particularly interesting species found by Jones, relocation of his sites would be desirable.

[207] For samples of the writing of Harrington (A.B. 1868, A.M. 1871) and of Eastwood (A.B. 1871, A.M. 1872), see McVaugh (1970, pp. 219 & 220).

In 1871, while Wheeler was apparently doing desk work in Detroit, Jones was again on Lake Superior, aiding with latitude and longitude determinations at Lester River and Burlington stations on the Minnesota shore closer to Duluth and at Detour station on the Wisconsin shore (south of Sand Island)[208] as well as at Thone's hill near Marquette, Michigan (in September).[209] He had been placed in charge of a division of A. R. Flint's triangulation party for July, and Flint commended him: "Considering his comparative inexperience and the poor instrument furnished him, I think Mr. Jones's results are entitled to favorable consideration. He rejoined my party about the 1st of August."[210] In 1872, Jones presented another 60 species (120 specimens) to the University of Michigan, presumably from the 1871 season although I have not yet located one so labeled.

Whether J. C. Jones collected plants at any time before or after his summer jobs with the Lake Survey, I do not know. One suspects that he was then merely collecting at the suggestion of O. B. Wheeler, whom he was officially assisting in triangulation work. Immediately after graduating, Jones became superintendent of schools at Pontiac, Michigan, and after five years he took a similar position at East Saginaw, where he was prominent in civic and educational affairs, especially in promoting the free textbook system in Michigan. He received an A.M. degree from the University of Michigan in 1875. In 1885 he moved to New York, where he was in charge of the schoolbook department of Harper & Brothers. After that firm withdrew from the schoolbook business, Jones became superintendent of schools in Newton, Massachusetts, but soon resigned to become chief of the educational department for another publisher (Werner) in Chicago, where he died at the age of 56.

One of the Lake Survey personnel who evidently did not go out in any field parties, but stayed in Detroit, was John M. Bigelow (1804–1878).[211] He was born in Vermont, studied in Ohio, and in 1832 graduated from the Medical College of Ohio (which had been founded in Cincinnati in 1820 by Dr. Daniel Drake, the eminent 19th century physician of the Midwest[212]). Dr. Bigelow then practiced medicine for a while in Lancaster, Ohio, where he became interested in botany and published a local flora. His chief botanical fame results from collections made during his service as surgeon with the Mexican Boundary Survey from 1850 until early in 1853 and, later in 1853, as surgeon and botanist under Lt. A. W. Whipple on the Pacific Railroad Survey. En route to the West on the latter mission, he visited in St. Louis with George Engelmann, to whom he had sent the cacti from the Boundary Survey; and he co-authored with Engelmann the account of the cacti in Whipple's report published in 1856.

After continuing to collect in California and working in Washington, D.C., until the summer of 1854, Bigelow returned to his practice in Lancaster. Lt. Whipple–now

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[208]These stations are described by Comstock (1882, p. 314).

[209]Lake Survey Report 1872 (Doc. 1559, p. 1066); Jones also served as recorder for A. R. Flint at St. Paul in June (p. 1054).

[210]Lake Survey Report 1872 (Doc. 1559, p. 1100). On Aug. 5, the party again divided, some to Tip Top (Ontario) and others to Huron Mts. (Michigan), but it is not clear to which Jones went. The party returned to Detroit on the steamer *Search* October 23.

[211]On John Milton Bigelow, see Atkinson (1878, p. 285); Noyes (1878); Burr (1930, 2: 248–249); Waller (1942); Rodgers (1942, pp. 221–228; 249–255); Ewan (1950, p. 164); Jepson (1962).

[212]Dr. Drake (1785–1852) collected in northern Michigan in 1842 (see Voss 1956, pp. 28–29) and later in the same year published a very readable account: "The northern lakes, a summer resort for invalids of the south" (*Western Jour. Med. Surg.* 6: 401–426. 1842).

Captain—ended his work in the West in 1856, when the Chief of Topographical Engineers (the Corps under which the Railroad Surveys, like the Lake Survey, had operated) reported: "Captain Whipple, engaged until September on Pacific railroad survey, is now charged with the improvement of St. Clair flats, and flats of Lake George, St. Mary's river, and of Lake Superior."[213] Whipple received additional responsibilities for lighthouses on Lakes Erie and Ontario, and remained in Detroit with the Topographical Engineers (but not the Lake Survey) until June 1, 1861, when he was relieved for service in the Civil War—in which he lost his life.

It seems probable that Whipple (whether on Bigelow's suggestion or otherwise) called his former associate to the attention of his fellow engineers in Detroit. For in 1860, Capt. George G. Meade, in charge of the U.S. Lake Survey, could report in regard to meteorological observations: ". . . this branch of the survey has been assigned to Assistant J. M. Bigelow, who will henceforth devote his whole attention, under my immediate direction, to the reduction and discussion of these observations. The tables attached to this report are but the commencement of what, it is hoped, the future will furnish . . ."; and in regard to water-level observations, he reported that late in the summer he "was able to assign Assistant J. M. Bigelow permanently to this duty, as well as to the meteorological department . . ."[214] Bigelow remained as assistant engineer in charge of water-level and meteorological observations until the end of December, 1866.[215] Hundreds of pages of meteorological data were published by him in the reports of the Lake Survey—and, I suspect, are largely overlooked today.

Although I. A. Lapham and others had long been interested in water-level fluctuations in the Great Lakes, observations by the Lake Survey were rather irregular before 1860, being taken by temporary gauges wherever surveys were being carried on. In 1859, four self-registering tide gauges and many other gauges and meteorological instruments were installed at a total of 19 stations around the Great Lakes; observers were employed to make daily observations and send the records monthly to Detroit.[216] It was thus John Bigelow in 1860 who began the regular charting and interpreting of lake-level fluctuations, an operation continued to this day by the Corps of Engineers.

After a little over six years with the Lake Survey, Bigelow served a year as physician to the Marine Hospital in Detroit. The Detroit Medical College, organized in 1868, began instruction in February of 1869 and Dr. Bigelow became a member of the first faculty, as "Professor of Medical Botany."[217] His course, according to the catalog, "will be illustrated by specimens gathered fresh in excursions into the country, and will give students the opportunity of gaining a practical acquaintance with the medicinal plants of this climate, a knowledge of which is invaluable to every physician." "This course," the catalog continues, "will be optional with the students, and will cost an extra fee."[218] Bigelow resigned in 1870 and was listed as "Emeritus Professor of Medical Botany and Materia Medica" until his death. From 1869 to 1873,

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213Report of J. J. Abert, Topographical Engineers, to Hon. Jefferson Davis, Secretary of War, 1856 (Doc. 894, p. 358); Whipple's relief is recorded in the 1861 report (Doc. 1118, p. 526).

214Lake Survey Report 1860 (Doc. 1079, pp. 305–306).

215Comstock (1882, p. 18).

216Comstock (1882, p. 12).

217On the history of the Detroit Medical College, see discussion of A. B. Lyons in the next chapter, and the references in note 257.

218Detroit Medical College, *Annual Announcement and Catalogue* for 1870, p. 4.

however, he served as surgeon in charge of the Marine Hospital—a post first held (1857–1861) by Dr. Zina Pitcher.[219] After retiring from practice, he moved to a farm outside Detroit and manufactured a proprietary preparation of opium, a watery extract called "svapnia."[220]

While Bigelow was in Detroit, George Engelmann was working on his revision of the North American species of *Juncus*—the true rushes, published in 1866 and 1868.[221] Engelmann did not include Bigelow among those whose aid he specifically acknowledged in sending observations and specimens, but his collections are frequently cited,[222] as is one of *Juncus stygius* by O. B. Wheeler from the north shore of Lake Superior.[223]

Although he was not associated with the Lake Survey, Albert E. Foote (1846–1895)[224] is most appropriately mentioned next. Foote was a native of New York state, who received his M.D. from the University of Michigan in 1867, after which he served a year as an assistant in the chemistry department. In 1869 he joined the faculty of Iowa State College, where he remained until 1876, when he settled in Philadelphia and established himself as a dealer in minerals and objects of natural history.

In the summer of 1867, Foote was one of 17 students and others who accompanied Alexander Winchell on an expedition to the mining region of Lake Superior, including Isle Royale.[225] (J. T. Scovell [1841–1915] collected about 50 plants on this trip, which was largely a non-botanical one.) The next year, as Winchell wrote:

> Dr. Foote, with unusual, and extremely creditable zeal for science, organized, at his own risk, an extensive expedition to the north shore of Lake Superior and the adjacent islands. The expedition left in the latter part of April and returned during September. The geological department of the University furnished the party with a tent, a camp-chest and utensils, and, in return for these facilities, as well as in recognition of the claims of his Alma Mater upon the services of her Alumni, Dr. Foote has furnished my department with a complete set of the geological, zoölogical and botanical specimens collected.[226]

On the 1868 expedition, 13 students accompanied Foote.[227] The plants collected are

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219Farmer (1890, p. 924).

220*Proc. Am. Pharm. Assoc.* 1877: 28 (1877); Noyes (1878); Waller (1942, p. 331).

221A revision of the North American species of the genus Juncus, with a description of new or imperfectly known species, *Trans. Acad. Sci. St. Louis* 2: 424–458 (1866); 459–498 (1868).

222Engelmann's standard collection, distributed with printed labels as "Herbarium Juncorum Boreali-Americanorum Normale," includes at least 11 numbers collected by Bigelow near Detroit in 1866 and 1867. Sheets of some specimens now in the herbarium of the Missouri Botanical Garden bear what are apparently original labels for these exsiccatae and these sometimes have more precise data than "near Detroit"—in fact, some of them reveal that the specimens were collected "near Sandwich Canada" [now within Windsor, Ontario] and not in Michigan at all. See also note 310.

223A Wheeler specimen of this rather rare species in the University of Michigan Herbarium is from Isle St. Ignace Aug. 5, 1866, and is labeled in Lewis Foote's hand on a piece of birchbark. (The Herbarium copy of Engelmann's monograph, incidentally, was O. B. Wheeler's and was presented to the University, along with much other literature, by the daughter of A. B. Lyons (see next chapter) after his death.)

224On Albert Edward Foote, see Kraus (1958).

225*Annual Report on the Museum of the University of Michigan,* 1867, pp. 2–3 (Regents Proc., pp. 235–236).

226*Statement of Operations in the Museum of the University of Michigan* . . . for the Year Ending Sept. 24th, 1868, pp. 3, 8–9 (Regents Proc., pp. 293, 299).

227Kraus (1958).

sometimes attributed to Foote and sometimes to "University Party." About 350 specimens, representing 275 species, apparently all from Isle Royale, were received by the University.[226] The principal set of duplicates seems to be at Ohio State University. One of the most interesting species collected by Foote at Isle Royale (Smithwick Island, according to the duplicate at Ohio State) was the mountain-cranberry, or lingenberry of the Scandinavians (*Vaccinium vitis-idaea*). The species has never been found in the state since (although I have searched Smithwick Island—and elsewhere—for it) and we list the status of it in Michigan as probably extinct[228]—I hope not extirpated by A. E. Foote!

We can only speculate whether Foote met any of the Lake Survey botanists who were on Lake Superior. They were all preceded, incidentally, on Isle Royale by Thomas C. Porter (1822–1901),[229] of Pennsylvania, who collected there in 1865. Porter was at Sault Ste. Marie and Ontonagon late in July, and spent the morning of August 2 at Isle Royale. On the return trip, the steamer stopped long enough for collections at Portage River (Houghton Co.), Marquette (including the mouth of Carp River), and Detour.[230]

In Canada, personnel of the Geological [later "and Natural History"] Survey did some early collecting about the upper Great Lakes even before the work of Macoun for that survey. Robert Bell (1841–1917)[231] was first appointed to the staff of the Geological Survey—then located in Montreal—in December of 1856, before he was 16; half a century later he retired, after having acted as director of the Survey 1901–1906. In the summer of 1860, while still a civil engineering student at McGill University, he assisted Alexander Murray in explorations on the southeastern and southern shores of Lake Superior; after Murray left for Sarnia, Bell led the party along the north shore of Lake Huron to the Bruce Mines and Manitoulin Islands (where he had been the previous season also). He collected both birds and plants; in the report on the latter, published in 1861, the identifications were credited to B. Billings, Jr.[232] About 275 species were listed, including some bryophytes and lichens, almost always with localities and dates—certainly the first records for many of the sites indicated. A "supplementary list" of 37 trees and shrubs concluded the report; only a few of these were included in the main list, but the supplement gave no dates and presumably represented observations rather than collections. Some of the dates are clearly inconsistent and must represent typographical (or other) errors, but it appears that there were three principal excursions: The last two weeks of June from Whitefish Bay to Keweenaw Bay, with collections from the Two Hearted River, Grand Marais, Grand Island, Marquette, L'Anse, and other points (fewer on the return trip); July 19-21 at Sault Ste. Marie, and then an excursion northward as far as Namainse [*sic* usually

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228See *Mich. Bot.* 16: 107 (1977).

229On Thomas Conrad Porter, see Britton (1901) and Ewan (1950, pp. 67–72; 284–285); Ewan cites several earlier biographical sketches, but Porter's Lake Superior excursion is generally not mentioned by biographers.

230See McAtee (1923) for Porter's itinerary and lists of some of the rarer species, as recorded in a letter of Aug. 1, 1892, to W. J. Beal.

231On Robert Bell (C. E. McGill 1861; M. D. McGill 1878), one of Canada's leading explorers, see *Applet. Cycl. Am. Biogr.* 1: 227 (1886); Kelly & Burrage (1920, pp. 92–93); and, especially, Ami (1927).

232Braddish Billings, Jr. (1819–1871) was a leading amateur botanist of Ottawa. For biographical data see William G. Dore in *Trans. Roy. Canad. Inst.* 33 (II): 95–96 (1962 ["1961"]) and in the Commentary accompanying his 1968 facsimile reprint of Billings' list of plants collected in the vicinity of Ottawa during 1866.

altered to Mamainse], with records from sites around Gros Cap, Goulais Bay, Batchawana Bay, and Pancake Bay, ending August 23; and then from September 10 to October 6 the records are from St. Joseph's Island, Bruce Mines, the Thessalon and Mississaugi Rivers, Manitoulin and La Cloche Islands.[233]

During the summer of 1866, Montreal physician John Bell (1845 1878) collected plants around northern Lake Huron, from Owen Sound to St. Joseph Island. He was

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[233]The localities cited in Bell's list are mostly recognizable today. "Sou-sou-wa-ga-mi Creek" where collections were reported June 29 and (apparently on the return trip) July 9 (other dates inconsistent) was between Huron River and Granite Point, Marquette Co., Michigan. The name must therefore refer to what now is called Iron River (the outlet of Independence Lake), although it was known as the Yellow Dog River long before 1860; the "So-Sa-Wa-Ga-Ming Club" was established at its mouth in 1898. Of course, identifications as well as dates and localities need to be taken with caution. "*Loiseleuria procumbens*" from the Two Hearted River was in reality almost certainly the crowberry, *Empetrum nigrum*, which has very similar foliage and for which one of the few localities on the south shore of Lake Superior is near the Two Hearted (see *Mich. Bot.* 3: 38. 1964.–stations since rediscovered). Another report of a far-northern species, "*Cassiope hypnoides*," from La Cloche Island is doubtless also a major misidentification.

Linear-leaved sundew, *Drosera linearis*, a species originally described by John Goldie in 1822 from his 1819 collections at Lake Simcoe, Ontario. (Photo by F. W. Lewis in 1961 at Dorcas Bay, Bruce Peninsula, Ontario.)

accompanying his older brother, Robert Bell, who was then professor of chemistry and natural science at Queen's University, Kingston, Ontario, and still employed summers by the geological survey. Drummond Island (Michigan), in addition to Cockburn Island and St. Joseph Island, was given special attention botanically. Bell's list, which includes a few bryophytes and lichens and has good locality data, was published in 1870 and makes no mention of previous work, such as N. H. Winchell's on Drummond Island[234] in 1860 or his own brother's on Manitoulin and elsewhere the same year.

In the summer of 1881, Robert Bell, by then a physician as well as a surveyor, and assistant director of the Geological and Natural History Survey of Canada, collected plants on an exploration in the wilderness along the Michipicoten River (well above its mouth on Lake Superior) and northward across the divide to the Moose River. His collections were listed, without very specific localities, by Macoun.[235] Bryophytes and lichens were included.

A few words about the east side of Lake Huron are in order here, but the Canadian basin of that lake deserves a fuller historical treatment. One of the first to collect in this area—and barely in it at that—was the Scotsman John Goldie (1793–1886),[236] who later spent some years in Russia before returning to Ontario to retire. Most of his collecting was closer to the lower Lakes or even farther east, but on June 27, 1819, he took a carriage from York [Toronto] to Lake Simcoe, where he botanized until July 5. In his report on the collections of that season, published in 1822, two species new to science were described from Lake Simcoe: the linear-leaved sundew, *Drosera linearis*, and the prairie buttercup, *Ranunculus rhomboideus*.

In his great *Flora Boreali-Americana* (published 1829–1840), Sir William Hooker cited a large number of species from "Lake Huron" on the basis of collections received by him from a "Dr. Todd," who collected in 1826.[237] Hooker also mentioned Goldie's Lake Simcoe discoveries as well as collections by Drummond[238] and (farther south) by David Douglas.[239]

John Macoun collected in the vicinity of Owen Sound in 1871, and the east shore of Lake Huron was explored more thoroughly during July and August of 1873 by John Gibson and Macoun, both then of Albert College. Their report, published the same year, was the first to call attention to the unusual botanical features of the Bruce Peninsula, which subsequent explorations have continued to uphold as one of the most interesting areas around the Great Lakes. Macoun and Gibson reported on rare plants in Ontario in 1875, noting the occurrence of several of the species at various Michigan localities on the authority of Henry Gillman, who evidently corresponded with Macoun, his fellow Irish contemporary.

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[234]List in A. Winchell (1861, pp. 328–330).

[235]Macoun (1883).

[236]On John Goldie, see his posthumously published diary for 1819, which is prefaced on pp. 3–5 with a biographical sketch presumably prepared by his son James (see Penhallow 1897, p. 8); the diary was republished, with a biographical sketch, in 1967 (Spawn 1967; see also Ewan 1968). On his 1819 collections, see Goldie (1822).

[237]See Barnhart (1965, 3: 388), who estimated about 200 citations of C. C. Todd's collections. Hooker refers, for example, to "My specimens from Dr. Todd, gathered at Lake Huron" (1: 113).

[238]See note 156.

[239]See chapter 8. David Douglas and John Goldie had been fellow students at the botanic gardens in Glasgow, where they were protégés of William Hooker.

Chapter 7.

FACING THE 20th CENTURY: THE RISE OF LOCAL SOCIETIES AND COLLECTORS

At the middle of the 19th century, statewide and county societies dedicated to the practical fields of agriculture and horticulture were beginning to flourish in most of the new states of the Midwest. These sometimes published early floristic lists (such as Lapham's for Wisconsin, Illinois, and Minnesota and Wheeler and Smith's for Michigan—to be mentioned later), for their transactions and reports were among the few local serials of the time. However, more strictly academic societies, often encouraging natural history collections, were soon thriving. Some of those in Wisconsin and Minnesota have already been mentioned.

In the metropolis of Michigan, the Detroit Scientific Association was organized March 27, 1874, "with the purpose of establishing a permanent museum, and cultivating a love for the study of natural history and general science."[240] Henry Gillman was elected one of its three curators and A. B. Lyons (to be discussed shortly) was cabinet-keeper. A museum was begun two months later and was moved frequently as it expanded, finally being relocated from the Detroit Medical College to the Public Library, which assumed control of the collections in 1885 (the year that Gillman retired as librarian).[241]

Much older than the Detroit Scientific Association were similar organizations in Flint and Grand Rapids. The Flint Scientific Institute was organized in February of 1853.[242] The next year, among the committees established was a "Committee on the Flora" which was "to report upon the indigenous plants, particularly the types, genera, and species peculiar to the region." The Institute held regular meetings once or twice a week; it lobbied actively in behalf of a state geological survey, circulating petitions in "all parts of the state" which, it felt, had an important influence in securing legislative action for the survey of 1859–1860 under the direction of Alexander Winchell.[243] The organization never fully recovered from the inroads on its membership occasioned by the Civil War. In 1877 its library and collections were transferred in trust to the Union School District of Flint to be preserved and maintained; the Institute remained as a corporate body, but it had essentially suspended operations. Like many such organizations, its founding is more precisely documented than its demise, since there was no formal disbanding. It evidently issued no publications other than its constitution.

The first president and guiding spirit of the Flint Scientific Institute was Daniel

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[240]Farmer (1890, p. 714). Essentially the same history of the Association is in Burton (1922, 1: 849–850). Apparently it lasted into the 20th century.

[241]Farmer (1890, pp. 761–762).

[242]On the Flint Scientific Institute, see Clarke in Ellis (1879, pp. 148–151); Meisel (1929, 3: 169); Hendrickson (1973).

[243]Dr. Manly Miles, brother-in-law of Dr. Daniel Clarke and also practicing in Flint, became Winchell's zoological assistant and later went on to a distinguished career in agricultural education.

Clarke (1811–1884),[244] who received his M.D. from Harvard in 1839 and came to Genesee County, Michigan, in 1840, practicing there until his death (except for a short return to Massachusetts 1845–1847). Dr. Clarke, despite the demands of his practice and his civic activities, found time to collect plants extensively, especially in the Flint region, and to exchange widely. His herbarium of over 5000 sheets was purchased in 1891 by the Agricultural College (now Michigan State University).[245] His collections from Flint and elsewhere in Genesee County are among the first major ones from the interior of the state after those of the first survey under Douglass Houghton, for they are mostly from the 1860's and early 1870's.

The Grand Rapids Lyceum of Natural History[246] was founded in 1854 and held meetings for the presentation of papers and discussion. Like the Flint Scientific Institute, it intended to develop a museum and library, but it did not do so before, like the Flint group, it suffered from the Civil War. Following the war, some of the members of the inactive Lyceum met with the enthusiastic Grand Rapids Scientific Club, a student organization at the Union [later Central] High School. The two groups merged, as of January 2, 1868, forming the Kent Scientific Institute. An agreement was reached with the high school to house the museum and library of the institute (collections having already been assembled by the students).

Among the few publications of the Kent Scientific Institute was a catalog of the flowering plants of the Lower Peninsula,[247] listing also ferns and one alga. This work claimed to add 275 species and varieties to the earlier catalog by N. H. Winchell; it is nowhere claimed that these, or the total list of some 725 species, were necessarily represented in the herbarium of the institute.[248] The list lacks any geographical or ecological data. However, several species and varieties alleged to be new to science are described with extreme brevity.[249] Nathan Coleman (1827–1887),[250] the author, evidently lived for about three years (1872–1874) in Grand Rapids, where he was a school teacher and a member of the Kent Scientific Institute.[251] He was born in Massachusetts and evidently had some interest in Iowa, where he spent his summer vacation in 1873 and where he had also been in 1868 and/or 1869.[252] Soon after his

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244On Daniel Clarke, see Beal (1902b) and Burr (1930, 2: 464). Harrington (1905, 3: 1470) gives his birth as April 10, 1811, in Dedham [Mass.] and I am assuming that date is more accurate than the 1812 one given by Beal. There is no doubt that Beal erred in giving the date of Clarke's M.D. as 1835.

245Beal (1899, p. 103).

246On the history of this and related Grand Rapids institutions, see Baxter (1891, pp. 249–250); Hendrickson (1973). I have also received helpful information in letters from W. D. Frankforter, present director of the Grand Rapids Public Museum, and his predecessor, Frank L. DuMond.

247Coleman (1874); see also Baxter (1891, p. 276).

248Although Baxter (1891, p. 250) states that the "herbarium has some 725 species of plants, collected by N. Coleman." Among the collections received by the University of Michigan in 1974 (see below), about 12 were attributed to Coleman but even they bore no labels explicitly stating that they were collected by him. The fate of Coleman's specimens remains unknown, unfortunately.

249Most of these were not included until very recently in the Gray Index, although two of them were not only indexed earlier but also accepted as varieties in *Gray's Manual: Polygonum amphibium* var. *stipulaceum* Coleman and *Chelone glabra* var. *linifolia* Coleman.

250The only published obituary of Coleman seems to be a very brief one by Webb (1887), which says nothing of botanical work or residence in Michigan.

251W. D. Frankforter informs me (1977) that Coleman is listed, as a teacher, only in the 1873–74 and 1874–75 Grand Rapids City Directories. For a clue on dates see also note 254 below.

252See *Bot. Gaz.* 2: 107 (1877).

Michigan list was published, he appears to have moved to Connecticut, where his address was given with several short notes published in *Botanical Gazette* 1876–1878. From 1884 until his death he was professor of mathematics and natural science at Wiley University in Marshall, Texas. He must have been quite interested in plant variation, to judge from his few published notes, including one[253] itemizing observations around Grand Rapids 1873–1874 and another[254] presumably based in part on his Michigan experience.

In 1902 the Kent Scientific Institute became the Kent Scientific Museum[255] and in 1936 the name was again changed, to the Grand Rapids Public Museum (to reflect the fact that it was a municipal institution, not a Kent County one). The herbarium, which had been stored since 1937 in an unused public school building, was placed on indefinite loan at Aquinas College, in Grand Rapids, when a new museum building opened in 1940 with no suitable facilities for such collections. When Aquinas found itself unable to continue to offer space for its safekeeping, the herbarium was placed in 1974 on permanent loan to the University of Michigan Herbarium, where the material has been carefully remounted and restored. Nearly 4400 Michigan specimens, collected around or before the turn of the century, are included. Among these are about 600 from the Detroit Scientific Association, some by Henry Gillman but the bulk collected or assembled by A. B. Lyons, whom we should digress to consider.

A. B. Lyons (1841–1926)[256] was born of missionary parents in Hawaii, where he attended Oahu College. He graduated from Williams College, in Massachusetts, in 1865 and later entered the medical school of the University of Michigan, where he received his M.D. in 1868. For the rest of his long life he was a Michigan resident, except for the years 1888–1895 when he returned to Hawaii as professor of chemistry at Oahu College and chemist to the Hawaiian government. The Detroit Medical College[257] was organized about the time that Lyons was finishing his studies in Ann Arbor and when it began to admit students in February of 1869, Lyons (who also assisted in chemistry) was among them, receiving the *ad eundem* degree of M.D. at the first annual commencement exercises June 8, 1869.[258] He then became professor of chemistry in the College,[258] serving until 1881, when he resigned during a faculty schism[259] and

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[253]Coleman (1877).

[254]Without title, *Bot. Gaz.* 1: 64 (1876), including the comment: "In 1872–3–4, I very frequently found *Polygonum amphibium* with salver form stipules. . . . I also found *P. Careyi* with salver form stipules. I wrote to Prof. Gray, but could not learn that he had ever seen this feature. The past season I found the same variation . . . around Bloomfield, Conn." It is odd that in his *Bot. Gaz.* notes, Coleman never indicated that in 1874 he had validly published names for some of the varieties observed in Michigan.

[255]According to Hendrickson (1973, p. 148), in 1904 the Institute gave up title to its museum and library to the school board–and the Institute "gradually disappeared."

[256]On Albert Brown Lyons, see Atkinson (1878, p. 518); Marquis (1908, pp. 294–295); Burton (1922, 5: 216–220). Additional information is in the files of the Alumni Records Office, University of Michigan.

[257]On the history of the Detroit Medical College, which was first located on the grounds of Harper Hospital, see Farmer (1890, p. 733); Hickey (1894); Detroit College of Medicine (1900); Burr (1930, 1: 511–535); Hanawalt (1968); and the annual catalogs of the College. In 1885 it merged with the Michigan College of Medicine, which had been organized in 1879, to form the Detroit College of Medicine–which ultimately became the Wayne State University School of Medicine.

[258]Detroit Medical College, *Annual Announcement and Catalogue* for 1870. The same publication for 1871–1872 notes that "Prof. A. B. Lyons, whom ill health obliged to resign a year ago, has now fully recovered and will resume his old position as Professor of Chemistry." The full title was apparently enlarged in 1877 from "Professor of Chemistry and Toxicology" to add "and Director of the Chemical Laboratory."

became consulting chemist for Parke, Davis & Company, with which firm he was associated until 1887. In September of 1897 he became chief chemist and in 1898 secretary for Nelson, Baker & Company, manufacturing pharmacists in Detroit, and he was a director of that firm at the time of his death. An active member of the Detroit Academy of Medicine[260] and other organizations, he served as an editor of the *Detroit Review of Medicine and Pharmacy*, as editor of *Pharmaceutical Era*, and for 20 years (1900–1920) as a member of the revision committee of the *U.S. Pharmacopoeia*.

Lyons' principal botanical publication, and one which emphasizes the importance of natural products to the early pharmaceutical industry, was an alphabetical directory[261] of plant names and synonyms, including all genera of flowering plants (except grasses and sedges) native in North America and species of medical or economic importance, with fully indexed names from the pharmacopoeia, vernacular names in several languages, and medicinal properties. With a reputation as an authority on plant synonymy and nomenclature, Lyons intended this work "to meet the practical needs of the retail druggist, who is often called upon to supply some root, bark or herb of which only an unfamiliar popular name is known to the customer." In 1877 Dr. Lyons read a paper on the indigenous medicinal plants of Michigan before the Detroit Academy of Medicine, and it was published early the following year in two installments in *The Detroit Lancet*.

When the Detroit Scientific Association was founded, Dr. Lyons was a charter member and its first cabinet-keeper for several years. In April of 1875 he wrote to Miss E. C. Allmendinger of Ann Arbor: "I shall be glad to show you also the beginnings of a museum which we have made in the Detroit Scientific Association . . . Practically I have at present the supervision of the herbarium of the Assoc^{n}, which is nothing very extensive as yet . . .[262] And the next month he wrote: "Our botanical specimens we are putting up on sheets about 14′ × 16′. Some we have simply glued to the sheet. Others we have attached with strips of paper. We have not yet decided how to arrange the herbarium as a whole–I have difficulty making out Solidagos–Is that a unique experience, I wonder? Mr. Gillman told me 'he took them in hand one season & mastered them in a few days' When I asked him to help me name them, however, I found he was as often puzzled as myself. We could not agree, with 'Gray' before us, even."[263] In August, he again referred to his activities: "I intend, if I ever have time

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259Hanawalt (1968, p. 54).

260Also active in the Detroit Academy of Medicine (founded in 1869) was an 1865 Williams College classmate of Lyons', Dr. Leartus Connor, prominent Detroit physician, editor, and medical historian (see his "Historical sketch of the deceased founders of the Detroit Academy of Medicine," *Jour. Mich. State Med. Soc.* 7: 291–295. 1908). Connor was for a time co-editor with Lyons of the *Detroit Review of Medicine and Pharmacy*.

261The full title of this 467-page work, published in 1900 by Nelson, Baker & Co., is "Plant Names Scientific and Popular including in the case of each plant the correct botanical name in accordance with the reformed nomenclature, together with botanical and popular synonyms and vernacular German, French and Spanish names. The list comprises all important medicinal plants with their pharmacopoeial names, the principal food plants of the world and all others of any economic importance, giving especial prominence to those which are indigenous in the United States"! A second, revised and enlarged, edition (630 pp.) was published in 1907 with only a slightly condensed and more modest title.

262Letter of April 7, 1875, in Allmendinger papers, University of Michigan Herbarium.

263Letter of May 26, 1875, in Allmendinger papers, University of Michigan Herbarium. The specimens as received in Ann Arbor in 1974 from the Grand Rapids Public Museum were still mounted in the same two ways, on rather thin paper. After a hundred years, they have been remounted on better paper (the old collection evidently suffered water damage at some time). The original labels of the Detroit Scientific Association have, of course, been retained; those for

to over haul Mr O. B. Wheeler's plants, many of which are from Lake Superior—Mr W. offers us specimens whenever he has duplicates—"[264] It is quite clear that there was an active group of dedicated amateur botanists in Detroit in the early 1870's, including both physicians and personnel of the Lake Survey. How or when the herbarium of the Detroit Scientific Association got to Grand Rapids (or why!) seems now to be unknown.

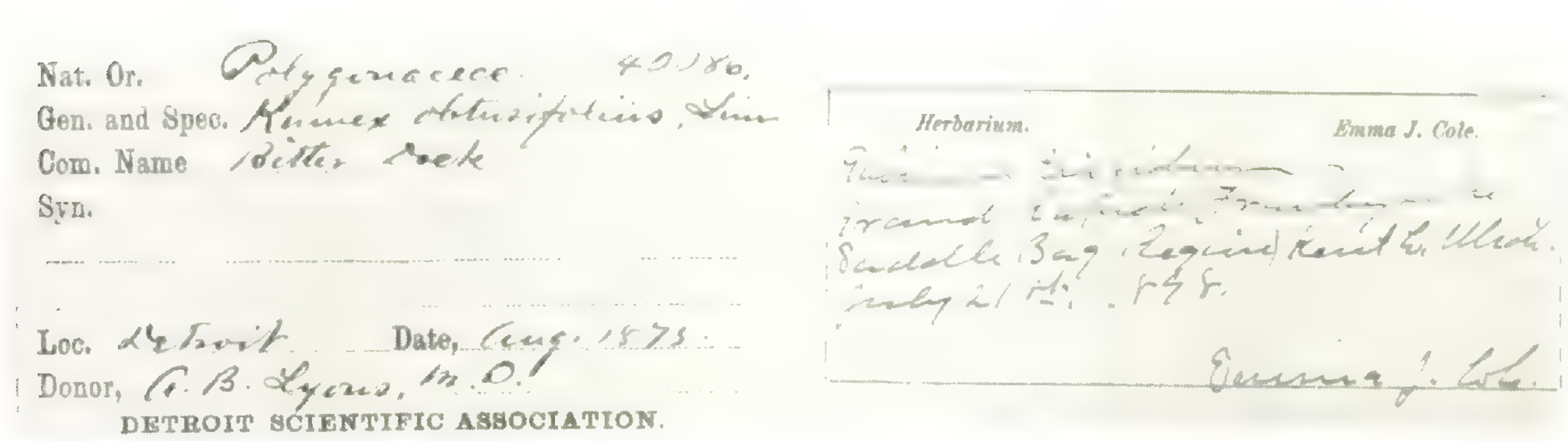
The rest of the Grand Rapids Public Museum herbarium consists—as far as Michigan is concerned—largely of collections by the extremely active group of amateurs centered around Emma J. Cole (1845–1910),[265] who evidently began collecting about 1876 and published an excellent flora of the Grand Rapids area (including part of adjacent Ottawa County) in 1901. Miss Cole was born in Milan, Ohio, but the family moved soon to Michigan and she attended schools in the Grand Rapids area. She entered Cornell University in 1876 and remained three years. Later, she studied botany one summer under E. S. Burgess at Martha's Vineyard, and another summer with W. W. Rowlee. From 1881 until her retirement in 1907, she taught at Central High School, where an active botanical club was organized in June of 1896, including former students as well. She seems to have influenced a large number of students and others with her enthusiasm for botany, and several went on to college and/or careers in the field.[266] Well over 100 Michigan collectors are represented in her herbarium, most of them local Grand Rapids people although some represent exchange contacts. Miss Cole's own collections, together with those of her friends and pupils, are valuable for documentation of the flora of a now-populous part of the state nearly a century ago;

Gillman's specimens are in his own handwriting; most of those for Lyons' and O. B. Wheeler's collections are in unknown hands (not theirs!). Data, especially for Wheeler's, are often very scanty, and since the label form provided a space for "Donor" but not for collector, it is not always clear who the collector was. Many specimens with Lyons indicated as donor are from "Lake Superior"; Lyons' own collections otherwise seem to be mostly from Ann Arbor (while he was a student, e.g. 1867) and the Detroit area.

[264]Letter of August 16, 1875, in Allmendinger papers, University of Michigan Herbarium.

[265]On Emma Jane Cole, see Beers (1900, pp. 418–419); Voss (1955, p. 81); and unpublished material distributed by the Department of Botany, University of Michigan, to holders of the Cole Fellowship.

[266]A number of her associates are mentioned in her flora (1901, pp. v–vi), including 10 other private herbaria assembled in Grand Rapids besides her own. Among these was the collection of Charles W. Fallass (1854–1942), who moved to Petoskey in 1898; I have elsewhere presented some notice of his work (Voss, 1955). The most prolific collectors among the "alumni" of Miss Cole's were W. Earle Mulliken, Homer C. Skeels (1873–1934), and George D. Sones (1866–1895). Sones was in charge of the herbarium of the Kent Scientific Institute for a period in the 1880's.


Nat. Or. Polygonaceæ. 42186.
Gen. and Spec. Rumex Acetosella, Linn
Com. Name Sheep Sorrel
Syn.
Loc. Detroit Date, Aug. 1873
Donor, A. B. Lyons, M.D.
DETROIT SCIENTIFIC ASSOCIATION.
Herbarium. Emma J. Cole.

Left: Label written by A. B. Lyons for the herbarium of the Detroit Scientific Association. *Right*: Label written by Emma J. Cole. (Both labels reduced.)

furthermore, they include the type material of several *Crataegus* described by C. S. Sargent—including *Crataegus coleae*, a hawthorn which he named[267] for the collaborator who supplied him with 20 new species. (Sargent visited Grand Rapids in 1901.) At her death (on a collecting trip in Mexico), Miss Cole left the residue of her estate to establish a fellowship in botany at the University of Michigan.

The Ann Arbor Scientific Association was formally organized—after preliminary discussions—on April 10, 1875, with six charter members.[268] As with similar organizations, meetings were held frequently for presentation of papers and discussion. The membership included local amateurs and teachers as well as University of Michigan people. At the meeting of June 5, 1875, two of the non-University members, "Miss Mary H. Clark and Miss E. C. Allmendinger were made a committee to make out a list of plants found growing within a radius of four miles of Ann Arbor." Miss Clark died suddenly on the last day of that same month, but at the meeting of December 4, 1875, Miss Allmendinger "from the Committee on the 'Flora of Ann Arbor,' made a final report, which was accepted." The report[269] is mostly a list, with very few precise localities, but it is a valuable record of native and introduced species a century ago. The author noted that 16 of the 848 species listed were introduced and that two of

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267 Sargent, *Trees and Shrubs* 1: 7 (1902).

268 On the Ann Arbor Scientific Association, see its *Proceedings* (1876); it is also discussed on pp. 318–323 of an unpublished manuscript by H. H. Bartlett, "Botany at the University of Michigan through the First Century, 1837–1937," in the Bartlett papers, University of Michigan Herbarium.

269 Allmendinger (1876). This was republished with very few changes (other than correction of numerous typographical errors) as "Flora of Washtenaw County" in Chapman (1881, pp. 195–206).

DETROIT

Review of Medicine and Pharmacy.

OFFICE, 94 CASS STREET,

LEARTUS CONNOR, M. D. } Editors
ALBERT B. LYONS, M. D. }

Detroit, Sept. 29 - 1875-

Miss E. C. Allmendinger

I am too many B look
esp any more stylish paper — & I have n't
time B write more than a few lines,
just to let you know that I still

Letterhead (slightly reduced) of the *Detroit Review of Medicine and Pharmacy* (see footnote 260), with beginning of a letter from A. B. Lyons to Elizabeth C. Allmendinger.

these, Canada thistle (*Cirsium arvense*) and bur grass (*Cenchrus*) "will give trouble in the future if not soon exterminated." Only a single volume of *Proceedings* of the Association, for the year ending May 1, 1876, was published. In the Allmendinger papers at the University of Michigan Herbarium are notices of meetings through December 1, 1877, but the organization lingered on until May of 1886.[270]

Elizabeth C. Allmendinger (1837–1909),[271] instructor of botany at Ann Arbor High School since 1873, was a member of a pioneer Ann Arbor family. Her nephew, George F. Allmendinger, who lived with her, presented her herbarium to the University of Michigan after her death. During the 1868–1869 year and apparently one or two others, she taught at negro schools in the South. In the 1870's she was assisting Prof. Mark Harrington—and later his successor, Prof. Volney Spalding—in arranging the collections of the University, to which she devoted a great deal of effort, mostly on a volunteer basis. (She was permitted to keep duplicates for her own herbarium.[272]) In her papers now at the University Herbarium is an undated [1879?] memorandum signed by V. M. Spalding: "The Herbarium and Botanical Workroom are placed in charge of Miss E. C. Allmendinger. Admission to these rooms and work done in them will be under her direction."

Miss Allmendinger's frequent collaborator in botany, Mary H. Clark (1813–1875),[273] came to Michigan from New York in the fall of 1837 when her father, an Episcopal clergyman, moved to Brighton. In 1839 before the University was admitting students—she founded in Ann Arbor, with her sister Chloe as vice-principal, The Misses Clark's School (earlier called the Misses Clark's Young Ladies' Seminary), which she served as principal or headmistress. This was a pioneer institution, conducted until Miss Clark's death, and was no doubt inspired by Emma Willard's Troy Female Seminary, which she reportedly attended after seven years of teaching and before moving to Michigan.[274] Mrs. Willard—who learned all she could from Amos Eaton—did endorse The Misses Clark's School, an 1842 prospectus of which includes in the list of books used Eaton and Wright's *Manual* and "Mrs. Lincoln's Botany."[275] Miss Clark was described as "a small nail-biting, nervous creature with a face one would long remember"[276] and the "special intellectual interest of this lady was in the study of botany."[277] Miss Clark had come to Michigan the year that Elizabeth Allmendinger

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[270]Bartlett manuscript, p. 320 (see note 268).

[271]On Elizabeth Catherine Allmendinger, see Beakes (1906, p. 219); there is an obituary on p. 1 of the Ann Arbor *Daily News* for March 22, 1909. At the time of her death, she was the oldest resident of Ann Arbor who had been born in the city.

[272]Bartlett manuscript, p. 297 (see note 268).

[273]For information on Miss Clark and her school, see Stephenson (1928) and files in the Michigan Historical Collections, University of Michigan. A long obituary is on p. 3 of the *Michigan Argus* (Ann Arbor) for July 16, 1875.

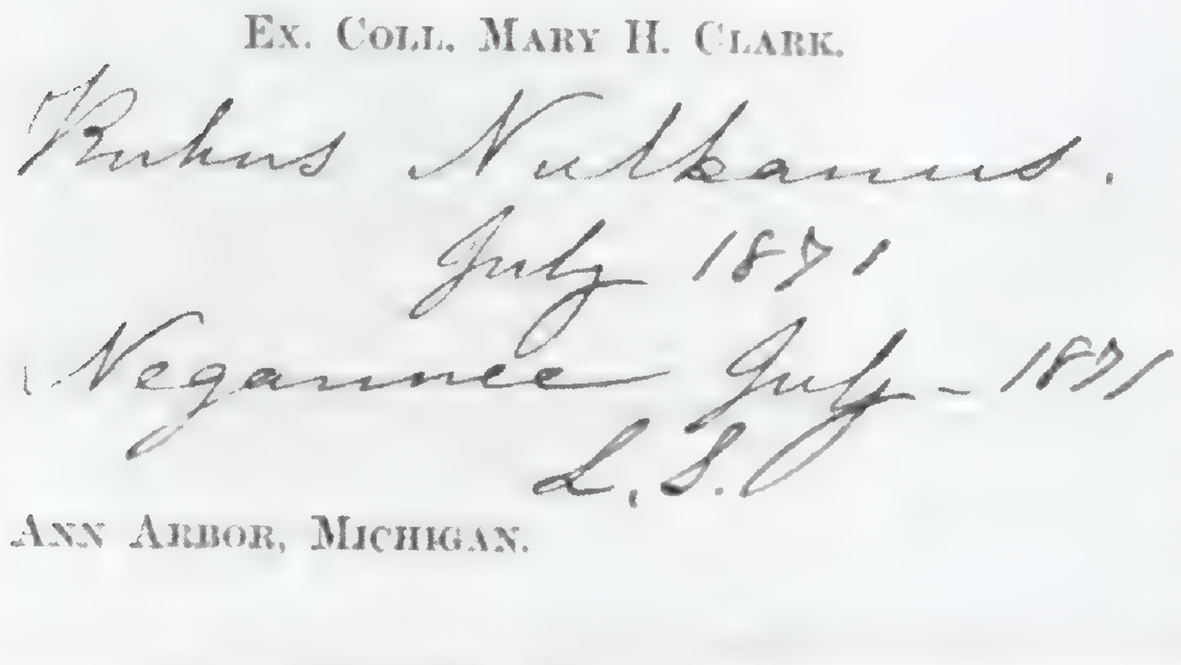
[274]Mary H. Clark is not listed among former pupils in *Emma Willard and Her Pupils or Fifty Years of Troy Female Seminary 1822–1872*, published by Mrs. Russell Sage (New York, 1898. 895 pp.). Perhaps the compilers of this volume had no address for Miss Clark and thus were unable to solicit information for it. Or perhaps her biographers are all wrong in saying that she attended the school.

[275]Almira Hart Lincoln (later Phelps), author of best-selling (but hardly non-technical) botany books, was the younger sister of Emma Hart Willard and was vice-principal of the Troy Female Seminary 1824–1831 (see p. 25 of history cited in previous note).

[276]Stephenson (1928, p. 202). Compare the statement in a letter from Isaac Martindale to Miss Allmendinger, December 11, 1873: "Please remember me to Miss. Clark, whose visit here last summer I shall not soon forget. . ." (Allmendinger papers, University of Michigan Herbarium).

[277]Stephenson (1928, p. 204).

was born; she knew Abram Sager and John Wright and almost certainly Douglass Houghton—all of whom had studied in Troy, and it was she who fostered the first botanical interests of Miss Allmendinger, who probably once was a pupil in her school. Miss Clark carried on an extensive botanical correspondence and exchange, as well as traveling some herself,[278] and Miss Allmendinger did likewise. Unfortunately, Miss Clark used a style of label all too common in her day, with "Ann Arbor, Michigan" printed as her address at the bottom. Specimens accompanied by these labels were not necessarily *from* Ann Arbor; but even when other localities were explicitly given on such labels, the specimens are often cited in monographs as being from the collector's address.



Label written by Mary H. Clark, for a specimen from Negaunee, L[ake] S[uperior], 1871 [Marquette Co., Michigan]. Data written in this distinctive hand may presumably be relied upon, but Miss Clark's specimens are too often attributed to "Ann Arbor," printed as her address on the label.

Charles K. Dodge (1844–1918)[279] was a collector who was particularly obsessed with citing his home town almost every time he used his name. I have seen labels on which he did it three times, but usually it was printed neatly twice: "Herbarium of Chas. K. Dodge, Port Huron, Michigan" and "Collected by C. K. Dodge, Port Huron, Michigan." The specimen itself may not have come from anywhere in Michigan at all—nor from the home of the specialist who determined it for Dodge and whose address was generally also written on the label! Many odd and questionable distribution records in the literature are doubtless the result of such old labels, hastily misread or incompletely copied or misunderstood in the process of exchanges.

Dodge, born in Jackson County, Michigan, barely qualifies for inclusion in this 19th century story, for much of his collecting was done in the early years of the present century, in diverse parts of Michigan. But his "Flora of St. Clair County, Michigan, and the Western Part of Lambton County, Ontario" was completed in 1898, dedicated to the Port Huron Academy of Science—evidently another short-lived organization, and published in 1900. Dodge's flora is a thoroughly annotated 82-page listing in fine print of over 1100 species. It was another production of a local flora by an accomplished amateur, for Dodge was a lawyer (who, we are told by Billington, did not relish the nickname "Posy"). After graduating from the University of Michigan in 1870, where he had a course in botany under Alexander Winchell, he taught in the Upper Peninsula. He took an interest in botany about 1875, the year that he was admitted to the bar and moved to Port Huron to practice law. Except for two years

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278Henry Gillman wrote to Miss Clark April 11, 1867: "I think, from what you say, you would enjoy a tour on the Upper Lakes. It is a noble field. Perhaps you may get away some time." (Letter in Allmendinger papers, University of Michigan Herbarium.) Miss Clark did collect at Lake Superior in the early 1870's—perhaps as a result of Gillman's encouragement.

279On Charles Keene Dodge, see Jenks (1912, pp. 822–824); Mackenzie (1918); Billington (1921).

Mary H. Clark (1813–1875).
(From Stephenson 1927, p. 114.)

Emma J. Cole (1845–1910).

Charles K. Dodge (1844–1918).
(1917 photo)

Oliver A. Farwell (1867–1944).

(May 1889–May 1891) in the West, he remained for the rest of his life in Port Huron, where he served at various times in civic positions, including city attorney. In September of 1893 Dodge was appointed one of the deputy collectors of customs at Port Huron; he largely retired from the practice of law and had more time to devote to botany. He became dissatisfied with his herbarium about the same time and nearly started it all over. In 1895 alone, he collected, single-handed, over 6000 specimens (including duplicates used for exchange), preferring to travel by bicycle rather than horse and buggy.[280] Like most of his contemporaries, he exchanged widely. His own herbarium of some 35,000 specimens was left to the University of Michigan at his death, but unfortunately many of the records included in his published lists (especially the later ones) are not supported by specimens.

Another prominent collector much of whose activity in Michigan was in the early 20th century was Charles A. Davis (1861–1916).[281] After graduating from Bowdoin College, in Maine, in 1886 and teaching for a year in Chicago, he came in 1887 to Alma College, Michigan, to teach natural science and chemistry. (The college had just been founded in 1886.) He immediately began collecting specimens about Alma and annotating a copy of Wheeler and Smith's "Michigan Flora"–new in 1881.[282] When the geological survey of Michigan resumed activity, Davis was employed summers as a field agent, beginning in 1896, and was able to collect plants particularly in Tuscola and Huron counties. Volney M. Spalding then asked him to organize a new program in forestry at the University of Michigan, authorized by the regents in 1901. In 1905 Davis received his Ph.D. from the University, with a classic thesis on peat, and in the same year he left his position as instructor in forestry to become curator of the herbarium, from which post he resigned in 1908 to move to Washington, having become peat expert for the U.S. Geological Survey.

Space will not permit even mentioning all the resident collectors becoming active in Michigan toward the end of the 19th century. Only one more should be cited briefly in this chapter, one who has already been the subject of a major treatise. Oliver A. Farwell (1867–1944)[283] collected very extensively in his home territory on the Keweenaw Peninsula during the last two decades of the previous century. His father was manager of one of the leading copper mines, the Cliff. After moving to Detroit in 1892, where he became botanist for Parke, Davis & Company, Farwell explored southeastern Michigan vigorously, but this was mostly in the 20th century, as were many of his vacation trips and post-retirement years back in the Copper Country. Farwell left us the impression of not having been very well organized, and his early collections, especially, are sometimes suspect as to accuracy of dates or localities. Nevertheless, he had a keen eye for oddities and he published names for a large number of minor variants. His large personal herbarium was left to the Cranbrook Institute of Science, where it is now well organized and indexed. An additional set of Farwell's specimens from the Parke, Davis herbarium came with that collection to the University of Michigan in 1933.

280Dodge (1896).

281On Charles Albert Davis, see Lane (1917); Dana (1953, pp. 9–23); Jones (1977, pp. 279–282).

282Davis' copiously annotated copies of the three Michigan floras (Wheeler & Smith 1881, Beal & Wheeler 1892, Beal 1905) are at the University of Michigan Herbarium and are often useful in supplementing data on his labels. Collections from "about Alma," for instance, were sometimes from an adjacent county.

283On Oliver Atkins Farwell, see McVaugh, Cain, & Hagenah (1953); Bartlett (1954); Wells & Thompson (1973).

With so many active naturalists in Michigan, it is surprising that a state society—spoken of from time to time—should have been so long being organized. The Wisconsin Academy of Sciences, Arts, and Letters was founded in 1870 and the Minnesota Academy three years later, but not until the 1890's were serious steps taken toward a similar society in Michigan.[284] Finally, a meeting was called for June 27,

[284]On the founding of the Michigan Academy, see pp. 5–12 of its First Report (for 1894–1899), published in 1900. The name was expanded in 1921 to include "Science, Arts, and Letters."

MICHIGAN FLORA. 83

CHAMÆLIRIUM

Devil's Bit. 1190. luteum, Gray. (***)
Dr. A. B. Lyons.

TOFIELDIA

False Asphodel. 1191. palustris, Hudson. U. P.
Isle Royale,—Dr. A. B. Lyons.

False Asphodel. 1192. glutinosa, Willd. Th.
Sphagnous swamps. Frequent.

UVULARIA

Large-flower'd Bellwort. 1193. grandiflora, Smith. C. & S.
Rich woods. Common.

Mealy Bellwort. 1194. perfoliata, L. Th.
Rich woods. Marquette Co.—Burt MS. Cat.; Flint; Macomb Co. Infrequent.

OAKESIA

Sessile-leaved Oakesia. Wild Oats. 1195. sessilifolia. Th.
Low woods. Apparently infrequent S. Ann Arbor—Allmend. Cat.; Ypsilanti (!); Flint; Macomb Co.; Crystal Lake, Montcalm Co. (!); and northward to Marquette Co.,—Whitney Cat.

STREPTOPUS

Twisted-stalk. 1196. amplexifolius, DC.
Fort Gratiot.—Winch. Cat.; Houghton Lake (!); to L. Superior where it is rare—Whitney Cat.

Twisted-stalk. 1197. roseus, Michx.
Drummond's Is. and Sugar Is.—Winch. Cat.; to L. Superior where it is very common—Whitney Cat.

CLINTONIA

Clintonia. 1198. borealis, Raf. Th.
Follows the Lake Michigan shore down as far as S. Haven; on the eastern side of the State reaches to Macomb Co.—Dr. D. Cooley; and in the center of the State is found in Ionia Co. (!). Very common north of latitude 43°.

SMILACINA

False Solomon's Seal. False Spikenard. 1199. racemosa, Desf. (***) Th.
Moist grounds. Common.

1200. stellata, Desf. Th.
Moist banks. Common.

1201. trifolia, Desf. Th.
Sphagnous swamps. Frequent.

MAIANTHEMUM

1202. bifolia, DC. Th.
Woods, everywhere.

POLYGONATUM

Smaller Solomon's Seal. 1203. biflorum, Ell. (***) Th.
Ann Arbor.—Winch. Cat.; Ionia Co.(!); and northward. Open woods. Common.

Great S. S. 1204. giganteum, Dietrich. (***) Th.
River banks. Stems often very tall and channeled on one side. Intermediate forms between this and the preceding, occur.

ASPARAGUS

Asparagus. 1205. *officinalis*, L. (***)
Sparingly escaped from gardens in older parts of the State.

A page (slightly reduced) from C. A. Davis' annotated copy of Wheeler and Smith's "Michigan Flora" of 1881. Collecting sites of Alpena, Alma, Port Crescent, St. Louis, Lansing, and Medicine [Madison?] Lake are noted in the margins. (For the work of Wheeler & Smith, see p. 86.)

1894, at the University of Michigan and 25 persons assembled. William J. Beal (whom we shall soon mention again) was elected president of the temporary organization and among the other botanists who signed a membership list were Charles A. Davis, Oliver A. Farwell, Frederick C. Newcombe, A. J. Pieters,[285] J. H. Schaffner, and Charles F. Wheeler. It was recommended that the name "Michigan Academy of Science" be adopted. Organization was completed in December, 1894, and sections—including a botanical one—were established. Beal stressed the importance of a state survey of the fauna, flora, and other natural resources: "Michigan is far behind many other states east, west, and south in the study of fauna and flora. Primitive conditions are fast disappearing. In hundreds of townships, there are only fragments here and there which still contain the native wild plants. . . . Local societies for investigating this subject should be encouraged and assisted."[286]

The local societies, however, which had thrived in the last half of the 19th century for the most part only continued to decline, even as the new state academy was ascending. Some merged with others, some quietly died, some few grew into viable institutions. But all had been significant cultural influences in their communities. Collections, whether in the hands of local institutions or individuals, often received inadequate attention—especially botanical collections which are not adapted for public display purposes and which therefore there is less incentive to maintain. It is fortunate that so many of the large and historic plant collections built up by our botanical forbears have ultimately reached the major institutional herbaria in this region, where they can be properly cared for and readily consulted by those interested in local records and history. Most botanists have, of course, always distributed duplicates widely, exchanging with other collectors and submitting specimens to specialists for identification. However, as the 19th century progressed, the day soon passed when the botanical wealth of the Great Lakes of necessity ended up in New York, because John Torrey checked it; or at Harvard, because Asa Gray must see it; or in Philadelphia, where the Academy of Natural Sciences was founded in 1812, only two years after Thomas Nuttall's pioneering trip through the Lakes. With a great burgeoning of scientific information from our region came also the natural development of regional institutions and publications. Each new find did not have to be reported in Silliman's *American Journal of Science,* founded in 1818. One national journal, still thriving, the *Botanical Gazette,* was founded in 1875 primarily to be a journal of botany of the Midwest and West.[287]

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[285]Pieters' report on the plants of Lake St. Clair, published in 1894 and based on field work in 1893 sponsored by the Michigan Fish Commission, was probably the first significant paper dealing strictly with the aquatic plants (vascular plants as well as algae) of any portion of the upper Great Lakes.

[286]*Rep. Mich. Acad.* 1 (for 1894–1899): 13 (1900).

[287]See Rodgers (1944a, p. 33 *et passim*).

Chapter 8.
VISITORS FROM FAR AND NEAR

Never, of course, was there a time when *all* botanical exploration around the Great Lakes was done by "official" expeditions or by local botanists, whether amateur or professional. The list of those who passed through one or more times and gathered specimens or recorded observations would be a long list indeed. Cruises on the Great Lakes became popular by the 1860's and 1870's; the first lock at Sault Ste. Marie had opened in 1855, making Lake Superior readily accessible. Guidebooks for tourists and travelers were published, as mining, fishing, lumbering, and other communities were able to offer facilities and the reputation of the Lakes region grew for healthful fresh air and invigorating climate. Construction of lighthouses and preparation of navigational charts greatly improved the safety of shipping.

Botanists were among those who took advantage of opportunities to visit the Lakes. From the New York city region, for instance, Arthur Hollick (1857–1933) visited the Copper Country of Lake Superior in August of 1879—the year that both he and N. L. Britton (1859–1934) graduated from the Columbia School of Mines. Hollick's later career was in paleobotany, but he published a short list of vascular plants observed on his 1879 cruise to Houghton. Britton himself (of "Britton and Brown" and other fame) visited Lake Superior a few years later and also collected at Mackinac Island. Thomas Morong (1827–1894), clergyman and outstanding student of the pondweeds, vacationed in Michigan in 1882 and wrote afterwards: "Yes, I visited Michigan, as proposed, and had a 'splendid' time, as the school girls say. Spent the whole month of August in Northern Michigan, and had a really fine sail in a steamer from Sault Ste. Marie to Buffalo, on my way home. Collected plants at Manistee, Mackinac, & Sault Ste. Marie."[288] From Pennsylvania, T. C. Porter visited the Lake Superior region by steamship in 1865.[289] To give an idea of the diversity of individuals and of circumstances through which their lives touched this region, a few persons of special interest who do not fit neatly into the narrative thus far are cited rather briefly in this chapter. Most of them achieved greater recognition in another region.

David Douglas (1799–1834)[290] deserves mention, if only to avert confusion with David Bates Douglass, who collected in Michigan Territory three years before David Douglas, whose principal fame was achieved later in the Pacific Northwest. (Who has not heard of such plants as the Douglas fir?) In 1823, Douglas, who was head gardener at the botanic gardens in Glasgow, was engaged by the Horticultural Society of

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288Letter from Morong to Harry N. Patterson, Oct. 6, 1882, as quoted by Kibbe (1953, p. 431).

289See chapter 6, at notes 229–230.

290On David Douglas, see Harvey (1947); Beidelman (1969); and Douglas' *Journal*, published in 1914. Ewan (1950, p. 197) gives a thumbnail sketch, with references, and a long list of references is given by Stafleu & Cowan, *Taxonomic Literature* ed. 2, vol. 1 (*Reg. Veg.* 94. 1976), pp. 674–675.

London (now the Royal Horticultural Society) to explore in America for new plants to grow, particularly trees. He sailed from Liverpool in early June, arrived at New York two months later, and in mid-September was at his farthest destination–Amherstburg, Upper Canada [Ontario]. September 15–25 he botanized along the full length of the Detroit River, including on September 23 "an excursion across the river to Michigan Territory" where he "found several species of *Liatris*" and other plants. He was especially interested in the oaks of the region. Of the white oak (*Quercus alba*), he recorded: "On the banks of the River Detroit from Amherstburg to the junction of the Thames with the St. Clair in Upper Canada, and on the opposite banks, in the Michigan Territory, on a deep alluvial rich black soil, these trees frequently measure from 20 to 25 feet in circumference at 8 feet from the ground, and are from 80 to 100 feet high."[291] On a "small island" [Bois Blanc] opposite Amherstburg he gathered *Lonicera hirsuta,* a honeysuckle which created excitement in England. While Douglas is credited with introducing many North American plants into horticulture, they were mostly from the Northwest and not from the Detroit-Windsor area!

George Engelmann (1809–1884),[292] well known physician and botanist in St. Louis, Missouri, collected at the Manitou Islands in Lake Michigan in 1840.[293] He had come to the United States in 1832 upon completing his studies in Europe (where he began a friendship with Louis Agassiz), and in 1835 settled in St. Louis. In 1840 he returned to Germany, where he was married on June 11; on his return, he visited Asa Gray in New York, beginning a lifelong friendship and correspondence.[294] Engelmann evidently took his bride back to St. Louis via the Great Lakes–perhaps following a route from New York to Detroit similar to the one taken by Gray himself only two years earlier when he visited the officers of the new University of Michigan. A steamboat from Detroit to Chicago would almost certainly have stopped at South Manitou Island for "all the steamboats sailing on the upper lakes visit this place for supply of fuel, or for shelter in storms, (for the latter purpose used by all other vessels,). . ."[295] Like most botanists, Engelmann was undoubtedly an opportunist on such an occasion, and I suspect he gathered what specimens he could whenever firewood was being loaded. After returning to St. Louis, he wrote Gray in November

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291*Journal,* p. 32.

292Among the numerous references on Engelmann, see A. Gray (1884); Sander (1886); White (1896); Kelly (1914, pp. 157–162); Boislinière in Kelly & Burrage (1920, pp. 365–366); Ewan (1950, pp. 204–205). None of these mention his being on Lake Michigan, although some refer vaguely to Lake Superior. Sander (p. 7) states that it was during the last 10 years of his life that Engelmann's explorations included "Lake Superior and the northern country." This was presumably in 1878, for on October 7 of that year Engelmann presented specimens of copper from the Lake Superior mines to the St. Louis Academy of Science and gave a brief account of the vegetation along the Lakes (merely a few observations on oaks at Lake Superior and in Minnesota and Wisconsin, with no indication of exact place or date) (*Trans. Acad. Sci. St. Louis* 4: xx [Proceedings]. 1880). I have encountered no specimens of Engelmann's from Lake Superior.

293Specimens in the herbarium of the Missouri Botanical Garden; labels bear only the year or at most "Aug 1840" for a date.

294Dupree (1959, p. 97).

295Lt. James T. Homans (in charge of the new lighthouse district embracing Lakes Michigan and Huron) to the Secretary of the Treasury, Nov. 5, 1838, reporting on his selection of the site for the light on South Manitou, authorized by Congress July 7, 1838 (25th Congress, 3rd Sess., U.S. House Doc. 24, p. 119 [Doc. 345]). Construction began in 1839 and was completed early in 1840. (See also Myron H. Vent, *South Manitou Island,* 1973, pp. 15 & 46.) Although only woodcutters for fuel for steamboats inhabited the Manitous in the early 1840's, farming was later attempted. By 1898, the noted University of Chicago ecologist, H. C. Cowles, was taking a class to North Manitou (Rodgers 1944a, p. 178).

of the plants he had observed at Niagara and "others equally interesting I found on the banks of Lake Huron and on the islands of Lake Michigan."[296]

The influence (more or less indirect, to be sure) of Upper Peninsula copper on Michigan botany would be a story in itself. Long known to the Indians, copper deposits were first "officially" reported from the region by Douglass Houghton, who, as we have noted, collected plants in the course of his geological explorations. After the Chippewas ceded the land west of Marquette to the government in 1843, the burgeoning mining industry began in the Copper Country on Lake Superior. Following Houghton's death in 1845 and the appointment in 1847 of C. T. Jackson, of Boston, to take charge of a Federal survey of the mineral resources of Michigan's new public lands, Boston connections with copper mining were important. O. A. Farwell's father was sent from Boston in 1871 to manage the fabulous Cliff mine. Farwell's prodigious botanical labors in the Copper Country have already been alluded to; it can be added here that his position as botanist for Parke, Davis & Company in Detroit resulted from family friendships with the founder of that firm, Hervey C. Parke, who had attended to the business records of the Cliff mine 1852–1863.[297] Even before the senior Farwell attempted to restore the Cliff to productivity, Boston money had been heavily invested in other copper mines,[298] for the influence of Charles T. Jackson was considerable. A prominent Bostonian, Jackson[299] was the first curator of minerals and geology for the Boston Society of Natural History (1838–1841) and was the Society's vice president 1843–1874.[300] J. W. Foster (1815–1873)[301] returned to Massachusetts in 1844 after practicing law in Ohio and assisting on the Ohio Geological Survey. In 1845 he was sent to Lake Superior in the interests of several mining companies. Two years later he was appointed to assist Jackson, along with J. D. Whitney, and in 1849 completion of the Federal survey was assigned to Foster and Whitney upon Jackson's resignation. (It is not surprising that Louis Agassiz, a leading spirit in the Boston Society of Natural History, conferred with Jackson and Foster in Sault Ste. Marie before setting forth on his 1848 expedition upon Lake Superior.)

296Letter of George Engelmann, Nov. 26, 1840, in the Gray correspondence at the Gray Herbarium (as reported to me by E. A. Shaw, 1978).

297Wells & Thompson (1973, p. 70); see also Donald Chaput, *The Cliff: America's First Great Copper Mine* (Sequoia Press, Kalamazoo, 1971), pp. 89–91, 100–102.

298See Abbott (1971, especially pp. 232–236) and the major previous accounts cited therein. It should be noted in passing that Louis Agassiz's son Alexander spent two years in the 1860's straightening out the operation of the faltering mines which were consolidated as the Calumet and Hecla Mining Company in 1871, with Alexander Agassiz, Rodolphe L. Agassiz (his brother), and Quincy A. Shaw (a son-in-law of Louis Agassiz) in control. For forty years or more the Shaw-Agassiz family had absolute control of Calumet and Hecla, which was the most profitable mine on earth until the 1920's, paying shareholders more in dividends than all the gold and silver bonanzas of California, Nevada, or Alaska–and enabling Alexander Agassiz to devote himself to scientific studies and support of his father's Museum of Comparative Zoology at Harvard. Could Douglass Houghton and William A. Burt ever have dreamed of what their reports of copper and iron would ultimately mean to the economy of this region–and, indirectly, to study of its natural history?

299On Charles Thomas Jackson (M. D. Harvard 1829), see *Applet. Cycl. Am. Biogr.* 3: 384–385 (1887); Kelly & Burrage (1920, pp. 597–598); Merrill & Fulton in *Dict. Am. Biogr.* 9: 536–538 (1932). Controversies over his discovery of ether and his role in inventing the telegraph are interesting but hardly relevant to the present account (see Harrington 1905, 2: 604 *et sqq.*). See the end of chapter 2 for Jackson's surveys in Michigan.

300Bouvé (1880).

301On John Wells Foster (who was president of the A.A.A.S. in 1869), see *Applet. Cycl. Am. Biogr.* 2: 512 (1887).

Massachusetts physicians ministered from time to time to the copper-mining communities and some of these were natural history collectors as well. It is reported in the *Proceedings* of the Boston Society of Natural History that at a meeting November 18, 1857, Charles J. Sprague (curator of botany for the Society 1852–1865) "read the names of a small collection of cryptogamous plants brought by Dr. Samuel Kneeland, Jr., from the Lake Superior region,"[302] and 11 widespread species (fungi and lichens except for one moss, *Neckera pennata*) are listed. Nothing is indicated of the locality or circumstances, but this is one of the first lists of such plants from Lake Superior–and perhaps the first recorded collection of a moss from Michigan. Samuel Kneeland, Jr. (1821–1888),[303] a native of Boston, demonstrated anatomy at Harvard Medical School 1851–1853 and served as secretary of the Boston Society of Natural History 1858–1862 (having also served as cabinet-keeper and curator of fishes). "In 1856 he went to Portage Lake, the copper district of Lake Superior, as physician and surgeon to several copper mining companies, where he remained one year."[304] The month after his return to Boston, he presented a paper on the birds of Keweenaw Point in which he refers to "a residence of nearly a year at Portage Lake, from August, 1856, to June, 1857."[305] The cryptogams earlier reported, however, cannot be assumed all to be from Houghton County for–typical of much geographic vagueness in those days–Dr. Kneeland explained: "In Keweenaw Point, I include that portion of the Upper Peninsula of Michigan which extends up into Lake Superior, embracing not only the Point proper, but the western portion as far as Ontonagon, the region of Portage Lake and Entry, and the Anse of Keweenaw Bay–all of which localities I have visited."[305]

Another New England physician, better known as a botanist than the zoologist Dr. Kneeland, was James W. Robbins (1801–1879).[306] A pondweed and an aquatic sedge, *Potamogeton robbinsii* and *Eleocharis robbinsii,* are among the plants which bear his name. He practiced in Uxbridge, Massachusetts for 30 years, until 1859, when he came to the Houghton-Hancock area as physician to the Pewabic copper mines, and he added extensively to his herbarium during the four years he was in Michigan. In 1863–1864 he collected on a tour down the Mississippi to Texas and Cuba, after which he returned to Uxbridge "where he spent the remainder of his life, mostly retired from medical practice and devoting his leisure to his favorite pursuit."[307] Labels of some of Robbins' specimens, which are widely distributed in herbaria, bear definite localities, but the numerous ones attributed to Keweenaw Point are not necessarily from the tip of the Keweenaw Peninsula (where the Point is designated on modern maps), as is clear from Kneeland's statement quoted above. Those labeled from Keweenaw Peninsula are more obviously uncertain as to county.

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[302] *Proc. Boston Soc. Nat. Hist.* 6: 296 (1859).

[303] On Samuel Kneeland, Jr. (A.M. Harvard 1840; M.D. Harvard 1843), see (among others) Runkle (1889); Harrington (1905, 3: 1474); Kelly & Burrage (1920, p. 669); *Dict. Am. Biogr.* 10: 459 (1933). (Harrington must be in error in giving Kneeland's birth year as 1820, for all other sources cite 1821.)

[304] Runkle (1889, p. 439).

[305] *Proc. Boston Soc. Nat. Hist.* 6: 231 (1859).

[306] On James Watson Robbins (B.A. Yale 1822; M.D. Yale 1828), see *Obit. Records Grad. Yale Coll.* 1879, pp. 335–336; Kelly & Burrage (1920, p. 984). See also *Rhodora* 3: 262 (1901).

[307] *Yale Obit. Records*–which also state: "During his professional life he had devoted himself largely to botany, gathering a valuable library, second, it is believed, to no private botanical library in the country."

Early botanical collectors were often trained as physicians—indeed, medicine was about the only field in which an advanced degree in science could be readily obtained, and botany was an important supporting field. Some medically trained scientists apparently undertook a regular practice only briefly or not at all (e.g., Asa Gray, C. T. Jackson, A. E. Foote); some collected plants when their time or travels allowed;[308] only a few, such as George Engelmann, conducted their affairs with such extraordinary efficiency that they could achieve distinction in both botany and medicine. But physicians were not the only group of professional persons with auxiliary interests in natural history. Clergymen were frequently noted as naturalists and, like physicians, were often located at several places during their careers. (Like non-practicing physicians, too, some theologically trained persons never held pastorates, or held them only briefly.)

Among the itinerant clergymen we have already mentioned T. A. Bruhin's work in Wisconsin. Another European priest of early days was Lawrence Holzer (1819–1876),[309] who was born in Bavaria, came to the United States as a missionary in 1847, and traveled extensively. An enthusiastic botanist, he sent quantities of specimens to Europe and built up a large herbarium of his own. His chief service was in Rochester, New York, but for a while he was at St. Mary's Roman Catholic Church in Detroit, where he evidently was acquainted with other local amateurs and whence he wrote to Mary H. Clark in 1867:

> I hope Mr Gilman [*sic*] & Mr Foote will bring a few collection [*sic*] of Carices etc. from Lake Superior. Please look out for Juncus filiformis. Dr. Engelman [*sic*] of St Louis wishes to get 100 good specimens with root & in fruit for his publication[.] I am told it is growing west of here on Mr Austins farm. I could never collect it yet. Last year in looking for it I discovered near Detroit Juncus Greenii [*sic*] & Vaseyi growing in close neighbourhood.
>
> Wishing you a happy success in your botanical labors & also that some of our professors and students at Ann Arbor would take more interest in botany . . .[310]

Apparently Holzer felt that the University was displaying insufficient interest in botany, but his own contributions were duly acknowledged by Alexander Winchell, who was responsible for all museum collections:

> Rev. L. Holzer of St. Mary's Church, Detroit, has presented to the University 27 species of plants growing in Michigan, but not heretofore existing in our Collection, nor embraced in any catalogue of the plants of the State. Mr. Holzer has also furnished a catalogue of 600 species of wild plants found growing in the Southeastern portion of the State—mostly about Detroit.[311]

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[308]Nathan Wright Folwell (1805–1879), for example, was a medical classmate of Asa Gray and evidently practiced in Monroe County, Michigan, in 1832, where he collected plants; the rest of his professional career was in New York state. Dr. Folwell appears to have been Gray's first botanical correspondent (Stuckey 1978b).

[309]On Lawrence Holzer, see Beckwith (1912, pp. 42–43).

[310]Letter of June 6, 1867, in Allmendinger papers, University of Michigan Herbarium. A specimen of *J. vaseyi* collected by Holzer Aug. 12, 1866, is in the University Herbarium, from "wet woods, swamps Detroit" and with the notation on the original label: "I have suspicions, that is a form between Vaseyi & Greenii." J. M. Bigelow collected *J. vaseyi* and *J. greenei* together in June, July, and August of 1867 in "Wet woods near Detroit" (Engelm. Herb. Junc. Bor.-Am. Norm., Nos. 17 & 19). [An apparent original label with a sheet of No. 17 in herbarium of the Missouri Botanical Garden reads more explicitly "2 miles south Grand Junction Aug 27th ? 1866."] I wonder if Holzer called these plants to Bigelow's attention, or vice versa. (Cf. also note 222.)

[311]*Statement of Operations in the Museum* . . . for the Year Ending 20th September, 1866, p. 7 (Regents Proc., p. 174). Winchell's report for the following year noted: "Rev. L. Holzer, of Detroit, has furnished a supplementary list of 54 species found within the State, but not heretofore

D. R. Shoop (1833–?)[312] was born in Pennsylvania, later lived in Illinois, and prepared for college partly at the University High School in Ann Arbor and partly by private instruction and study. He entered the senior class at the University of Michigan in 1863 and graduated with an A.B. degree in 1864. In the fall of 1864 he entered Auburn Theological Seminary (Auburn, N.Y.) and upon completion of his work there he received an A.M. degree from the University of Michigan in June of 1867. He was also married (to Anna E. Stanfield) in June of 1867 in Ann Arbor, where he had united with the First Congregational Church in 1857. Apparently he was connected in some way with Ann Arbor for about a decade and he was doubtless acquainted then with Miss Elizabeth Allmendinger, whom he addressed in his later letters as "Dear Friend Libbie," and who was also associated with the Congregational Church. Shoop was ordained in Tennessee in the fall of 1867 and during the 1867–68 year he was on the faculty of Maryville College, Maryville, Tennessee. From 1868 to 1873 he was in Bellevue (Eaton Co.), Michigan, presumably at least part-time in the ministry; for the next two years he was superintendent of schools in Eaton County.[313] He then served pastorates elsewhere in Michigan: Manchester, Washtenaw County (1876); St. Louis, Gratiot County (Congregational Church, 1877–1878); Hastings, Barry County (Presbyterian Church, 1879–1880); back in Bellevue (1880–1882); and South Haven, Van Buren County (1882).[314] His seminary last heard of him at Flushing, Genesee County, noting that in 1885 he was a member of the Saginaw Presbytery.[315] His family also lost all track of him in the 1880's, when he left Michigan for the West. Whether he continued in the ministry or collected plants is unknown.

However, Shoop was an active collector in his earlier years and exchanged specimens with others. On January 23, 1867, he wrote to Miss Allmendinger from

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included in any catalogue of the plants of the State." Holzer's lists are not to be found in the files of the University of Michigan Herbarium, and neither they nor any letters from Holzer have been found in the Winchell papers in the Michigan Historical Collections.

[312]Information about Darius Royer Shoop comes from Chase (1880), a file in the Alumni Records Office of the University of Michigan, and letters (1867–1878) to Miss E. C. Allmendinger, in the University of Michigan Herbarium. See also note in *Mich. Bot.* 11: 35 (1972), written while I was misinformed that Shoop was not an alumnus of the University.

[313]It was in Eaton Co. that Shoop found *Plantago cordata* (cited *Mich. Bot.* 8: 101. 1969), now considered an extirpated species in Michigan (*Mich. Bot.* 16: 108. 1977). On July 23, 1869, he wrote to Miss Allmendinger from Bellevue, urging her to "come & spend some months with us." To tempt her, he noted: "I have found 13 new plants here . . . Frasera caroliniensis which I have looked for for years & of which I found a few plants among the Mts of Tenn. but not in blossom grows here in abundance. The rare Plantago cordata a water or marsh plant also grows here . . ."

[314]It is difficult to reconcile the record in what appears to be a clipping from a printed catalog of seminary alumni (in Shoop's file, Alumni Records Office, Univ. Mich.) with data in the incomplete sets of published *Minutes,* Genl. Assoc. Congr. Churches Mich., available to me. According to the church *Minutes,* he became pastor of the Congregational Church in Pennfield [Calhoun Co., ca. 7 mi. southwest of Bellevue, in Eaton Co.] in April of 1872; that church had been organized Feb. 16, 1869. In May of 1873 (the time of the church's annual meeting), he is listed as acting pastor of the Bellevue church, which had been organized Oct. 1, 1871. In 1874, he was still living in Bellevue but that church was without a minister, while the Pennfield congregation (of 23 members) had "preaching a part of the time"; the 1875 situation was similar. By 1876 "Bellevue is practically extinct . . . Pennfield has nothing very encouraging" and both churches soon expired. It would appear that Shoop continued to live in Bellevue while serving, at least during part of his residence, the struggling church at Pennfield and perhaps teaching in addition. The clerical details are unessential for scientific purposes, but the sites of his residence and activity may help to clarify labels with specimens. Later, at least, he evidently ministered to Presbyterian churches.

[315]Note from Auburn Theological Seminary, Aug. 11, 1900, in Shoop file, Alumni Records Office, University of Michigan. It is interesting that there was once a "Society of Natural History of Auburn Theological Seminary" (see Meisel 1929, 3: 439).

seminary: "My Herbarium is scattered . . . part of it in Mich & a part here & much of it not yet arranged . . . As soon as I can arrange my herbarium I would like to exchange & it makes but little difference where we are if we but know each others postoffice address."[316] Since his specimens are scantily labeled (and his penmanship poor), as full an account of his life as now seems possible has been presented here. One of his closer friends and correspondents was Isaac H. Hall, who cited collections and observations from Shoop in short notes published 1870–1871.[317]

J. W. Stacey (1871–1943)[318] is another whose Michigan days–barely in the 19th century–are not well documented. His fame as a student of *Carex* in the western United States came during the last decade of his life. But he was born in Kalamazoo County, Michigan, and attended the literary department of the University of Michigan in 1896–97. In November of 1897 he was ordained in the Congregational ministry, and from 1897 to 1901 he was pastor of the Congregational Church in New Baltimore, Michigan, on Lake St. Clair at the Macomb-St. Clair county line.[319] Stacey's botanical interests evidently began no later than 1891 in the vicinity of Rochester (Oakland Co., Michigan). On December 11, 1894, he wrote to W. J. Beal in East Lansing, enclosing a "List of Phaenogams & Higher Cryptogams found growing within 15 miles of Rochester, Mich., by J. W. Stacey." It contained 982 species and the covering letter (from one who was to specialize in *Carex* some 40 years later!) noted: "This list is incomplete, especially in the Cyperaceae, but I did not want to put down any species unless I was sure of it. They have all been found since 1891, and I think another year I could add considerable . . ." Stacey offered to send Beal the exact localities for any species and asked for publications on botany. In October of 1900, he wrote to C. F. Wheeler, commenting on a *Panicum* identification and enclosing a list of 1116 names

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316On March 10, 1869, he wrote Miss Allmendinger from Bellevue, which he considered "a splendid field. We have a variety, beech & maple woods, oak openings, creek flats, & marshes. The country has the botanical advantage of being somewhat new also." And he urged her: "Please come out & stay with us all summer & botanize this region. . . . Take the railroad to Marshall & there is a stage running from Marshall here distance 13 miles." Miss Allmendinger was in Georgia earlier in 1869, but evidently visited Mr. and Mrs. Shoop and their child in September of that year.

317*Bull. Torrey Bot. Club* 1: 35–36; 43–44 (1870); 2: 18 (1871). Isaac Hollister Hall (1837–1896) was at the time a practicing attorney in New York city and active in church affairs–as well as an amateur botanist. In 1869 he passed Ann Arbor en route by train to Des Moines to observe the solar eclipse with an expedition from Hamilton College (of which he was an 1859 graduate), but he apparently did not stop (see *Bull. Torrey Bot. Club* 1: 27 (1870); letter of Dec. 2, 1869, to E. C. Allmendinger, in Univ. Mich. Herbarium). Hall also corresponded with Miss Allmendinger (whose aid he sought in keeping up with the address of the peripatetic Rev. Mr. Shoop!) and personally showed some of her troublesome specimens to John Torrey, for identification. A few years later, Hall was active in another field and he became a noted oriental and Biblical scholar (see *Applet. Cycl. Am. Biogr.* 3: 39. 1887).

318All available published biographical information on John William Stacey in botanical literature seems to be included in Howell (1944). It has not been possible to learn anything of Stacey's academic training in either theology or medicine, apart from the single year which he had at the University of Michigan. (See also next note.)

319Dates of Stacey's ministry are in the published *Minutes*, Mich. Congr. Assoc., Annual Meetings 1898 through 1905. In 1901 he was called to Clarksville (Ionia Co.); the 1904 and 1905 *Minutes* give his residence as Grand Rapids (Kent Co.) in the list of ministers associated with the Congregational Church, but he is not listed as the minister of any of the churches in the Grand Rapids Association and one must assume that he may have been some sort of assistant minister or executive there. What he did from 1906 until his move to California in 1914 is unknown. Presumably this is when he had the medical training indicated by Howell (1944, p. 183)–but not at the University of Michigan, despite Howell's implication; Howell says that Stacey interned at Bellevue Hospital, but he is not listed among the internes at the Bellevue Hospitals in the reports of 1908–1913 (the only ones available to me).

of plants growing in Oakland, Macomb, and St. Clair counties, with data more precise than the county seldom provided.[320]

Henry David Thoreau (1817–1862)[321] spent the last summer of his life on his longest journey, a 3000-mile trip to Minnesota in a vain hope, fostered by his physicians, that a change of climate would restore his deteriorating health. In May of 1861 Thoreau, accompanied by seventeen-year-old Horace Mann, Jr.,[322] son of the famed educator, traveled by train from Concord to Niagara Falls, Detroit, and (via Ann Arbor) Chicago, thence west to the Mississippi. A steamer on the river brought them early on May 26 to St. Paul. For nearly a month they botanized around the Twin Cities (except for an excursion up the Minnesota River); Thoreau read widely in libraries–but his health showed no sustained improvement. On June 23 they headed for home, via Milwaukee, where they spent the night of June 27 but made no botanical notes. The ship from Milwaukee paused long enough at Carp River [Leland, Michigan] for Thoreau to note a few plants including a "borraginaceous plant with 4 prickly nutlets & small flowers blue or rose, either color, stamens or [on?] corolla erect. What is it?" They stopped at the Fox and Beaver Islands and arrived June 20 at Mackinac Island.[323]

Thoreau and Mann stayed on Mackinac Island until the evening of July 4, when they sailed for Goderich, Ontario, whence they returned by train to Concord, arriving July 10. Thoreau made only one brief trip beyond Concord before his death the following May, and never had a chance to write up his chaotic notes, which were published in 1962 by Harding. They include various lists of plants, especially from the Twin Cities area of Minnesota and from Mackinac Island. These are of interest as a record of what species, especially introduced ones, were obvious at the time. In Minnesota, Michigan, Ontario, and New York, Thoreau at least five times noted an unknown small-flowered boraginaceous plant, which obviously challenged him. At Mackinac Island, for instance, he wrote: "Borraginaceous plant so common in Minnesota with lanceolate leaves & small blue flowers, prickly nutlets, common here & at Carp River." I have little doubt that this plant was the northern wild comfrey, *Cynoglossum boreale,* not distinguished from the larger-flowered more southern *C. virginianum* until Fernald described it in 1905. Thoreau's lungs may have been weak,

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320The letters and lists of Stacey's cited here are at the Beal-Darlington Herbarium, Michigan State University. According to Howell, Stacey "at least one summer did botanical field work with C. F. Wheeler." The "list of plants collected at Clarksville, Ionia county" cited by Beal (1905, p. 11) is not extant, if it ever existed; in fact, it was probably the 1900 list sent to Wheeler and on which Stacey's [later] address of Clarksville has been entered in Wheeler's hand.

321It is hardly necessary to offer documentation regarding Thoreau. The Minnesota journey is covered by Harding (1962; 1965, pp. 445–451).

322Mann, who had been encouraged in his natural history collections by Thoreau, entered Harvard in the fall of 1861 and studied botany with Asa Gray–the "first Bostonian of substantial family to take up the subject professionally" (Dupree 1959, p. 326). Gray encouraged him to visit the Hawaiian Islands and was grooming Mann to take over his classes and his duties as curator of the herbarium at Harvard (J. Gray 1893, 2: 566–567; Dupree 1959, pp. 337; 341–342). Mann graduated from Harvard in 1867 but his health declined and in 1868, at the age of 24, he died of tuberculosis, possibly contracted from Thoreau. Mann had been Charles J. Sprague's successor as curator of botany for the Boston Society of Natural History from 1865 until his death. His herbarium was bought for Cornell University (*Rhodora* 3: 256 & 288. 1901).

323*Not* Mackinaw City, despite the interpolations of Harding. There was no dock or settler at Mackinaw City, at the northern tip of the Lower Peninsula of Michigan, in 1861–nor until 1870. Mackinac Island (never called "city") had been settled 90 years previously and the fort was moved there in 1781 from the site of Mackinaw City, which was then abandoned until 1870. Both areas have been included in the term "Michilimackinac."

but his eyes were sharp![324] In the early 1850's he had started giving more serious attention to natural history and making collections (perhaps influenced by Louis Agassiz). His herbarium of over 1000 pressed specimens was presented after his death to the Boston Society of Natural History, whose library he frequently patronized after being elected a corresponding member in 1850.[325] It might also be noted here that Charles T. Jackson's brother-in-law, Ralph Waldo Emerson, had urged Jackson in 1847 to include Thoreau as an assistant on his survey of Michigan mineral lands for the U.S. government. Despite Thoreau's eagerness for the position, politics decreed other appointments and so he did not visit the Great Lakes until 14 years later.[326]

E. J. Hill (1833–1917),[327] clergyman, teacher, and noted Illinois botanist, spent many of his summer vacations on extended trips, during which he visited northern Wisconsin, Minnesota, and several places in Michigan, beginning around 1870. A native of New York state, Hill graduated from Union Theological Seminary in 1863 and then accepted the pastorate of a Presbyterian church in Homewood, Illinois. For 18 years before retiring in 1888 because of poor health, he taught at high schools in northeastern Illinois. One of his excursions northward was to Emmet and Cheboygan

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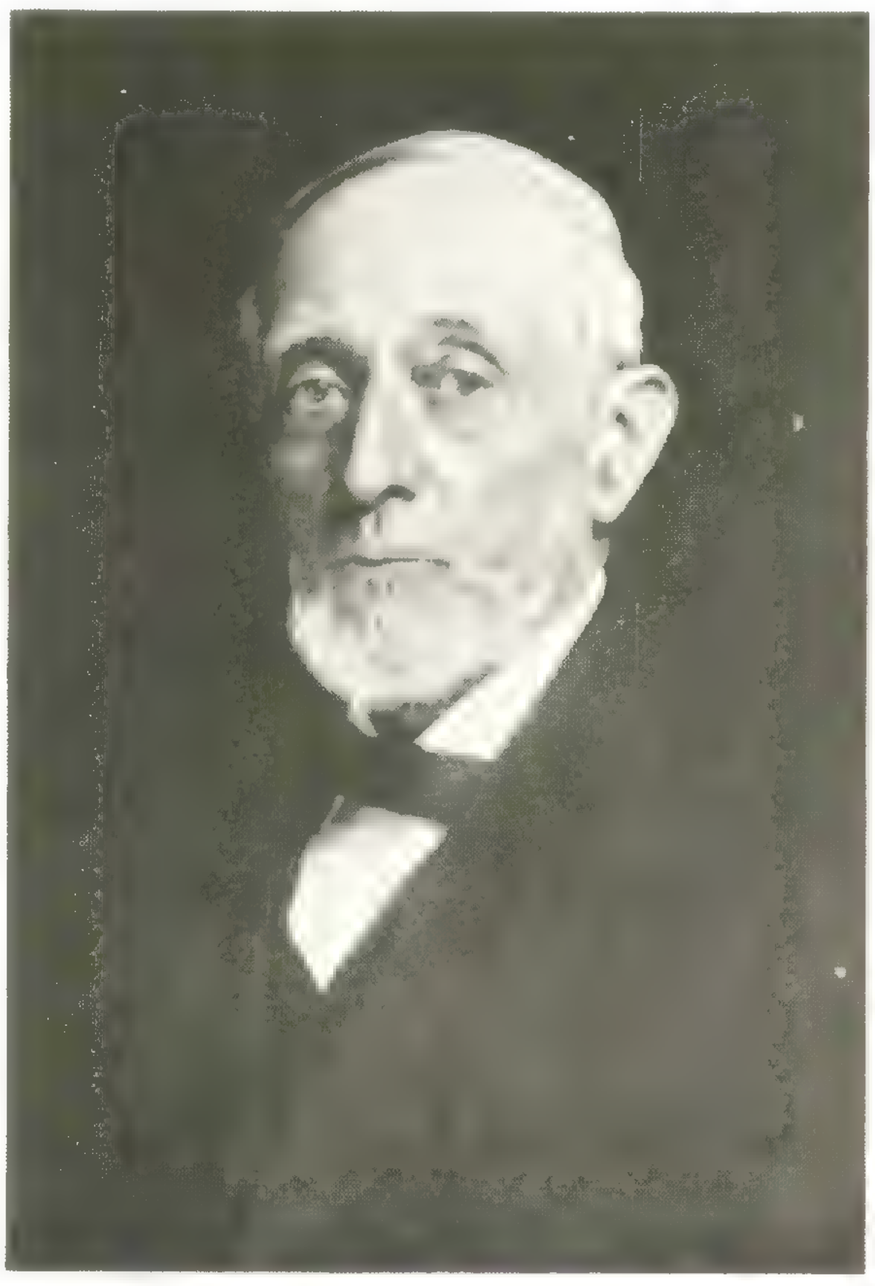
[324]The *Cynoglossum* noted at Mackinac Island by the Agassiz expedition in 1848 (L. Agassiz 1850, p. 23) was probably the same. Norton Miller has kindly looked for me at Thoreau's herbarium, now at the Gray Herbarium, and found no *Cynoglossum boreale*; indeed, there are apparently no specimens from the Great Lakes trip, after which Thoreau was probably too ill to prepare or label them (if any were actually collected).

[325]See Harding (1965, pp. 268–269; 290) on Thoreau's botanical collections. See also Paine (1961), who avers that Thoreau considered himself a botanist as well as a writer after about 1850.

[326]See Harding (1965, p. 197).

[327]The most complete account of Hill is by Agnes Chase (1917).

Present known distribution of *Potamogeton hillii*. The westernmost dot represents the original site where this pondweed was discovered by Hill in 1880, near Manistee, Michigan, revisited by Morong in 1882. (From Haynes in *Rhodora* 76: 611. 1974.)



E. J. Hill (1833–1917).
(From Chase 1917, facing p. 61.)

counties, at the northern tip of the Lower Peninsula of Michigan, in 1878, when, among other plants, he collected pondweeds along the "inland route" between Cheboygan and Crooked Lake–the second year that route was open.[328] In 1880, in Manistee County, Michigan, he collected the type material of a pondweed which was later named for him, *Potamogeton hillii*–still considered an uncommon species.[329] In 1881 he published botanical notes from numerous places where he had been along the Lake Michigan shore of Indiana and Michigan, Mackinac, and Sault Ste. Marie. In 1883, he was exploring the Menominee iron region in Michigan and Wisconsin, "clambering over rocks and fallen timber . . . making headway through cedar swamps and thickets, with only a path traced by deer and bear"[330] –rugged activity for a man long afflicted with lameness! His report stressed comparisons between the southern end of Lake Michigan and the northern region. In 1889, Hill explored the Marquette iron region in Michigan and the Vermilion Lake region of Minnesota–where Arthur, Bailey, Upham, and Holway had explored only three years previously and whose report, cited by Hill in his own account published in 1890, may even have inspired the Illinoian to visit the region.

328See Voss (1956, pp. 31 & 40).

329See *Mich. Bot.* 4: 13–14 (1965). The species may now be called "threatened" (*Mich. Bot.* 16: 105. 1977).

330Hill (1885).

Chapter 9.

TO BRING IT ALL TOGETHER: CATALOGING THE LOCAL FLORA

Some of the first efforts to list all the plants (at least the vascular plants) of the states of Wisconsin and Minnesota have already been mentioned in discussing early work in those states. I. A. Lapham was the author of the first floras of Wisconsin (1853), Minnesota (1875 but written in 1865), and also Illinois (1857), although the latter is excluded from the present history. In all these states, most of the area covered in any statewide flora is beyond the Great Lakes basin and information is not always sorted geographically in the earliest lists.

The first extensive list for Michigan did not attempt to cover all plants, but was an original annotated account of nearly 600 indigenous and naturalized species of reputed medicinal quality, published in 1858. Its author, Frederick Stearns (1831–1907),[331] had been employed in the drug business in New York and arrived in Detroit on New Year's day of 1855, walking across the frozen river from Canada. In April he established a retail drug store and the next year he added a manufacturing enterprise. His list of medicinal plants, published only three years after his arrival in Michigan, was based on information obtained from "very many of the medical gentlemen of our State, who, upon application, cheerfully afforded me the knowledge required." Evidently he circularized physicians throughout Michigan, and the resulting list is full of locally used remedies. Under a juneberry (*Amelanchier sanguinea*), for instance, we read:

> This beautiful shrubby tree is in full flower in our wet, swampy woods around Detroit, early in May, before the trees are in leaf, and it forms a striking and beautiful sight. The flower is white and nearly scentless; they are, in their freshly dried state, highly recommended by Dr. [Ira M.?] Allen, of our city, as a powerful anodyne in various nervous affections, in uterine diseases, and to assuage the after-pains of labor. The flowers are exhibited in infusion.

Many other interesting observations are in Stearns' list. Of the wintergreen (*Gaultheria procumbens*), he reported: "Large quantities of the berries are annually offered for sale in Detroit, and are simply eaten as a relish." A frankly unbelievable figure is given for the red raspberry (*Rubus strigosus*) at the St. Mary's River: "A Mr. Church, living upon Sugar Island, in that river, made in the year 1857, over 80,000 pounds of jam and jelly from the fruit he collected in his vicinity; the plants are plentiful in every portion of the State, of which the fruit, leaves, bark, and roots possess medicinal value." It is odd that this list is not cited by *any* of the later catalogers of the Michigan flora [N. H. Winchell, Coleman, Palmer, Smith, Wheeler, Beal]—not even by A. B. Lyons (see chapter 7 above), who unquestionably knew

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331On Frederick Stearns (not to be confused with his son, Frederick Kimball Stearns, nor his grandson, Frederick Sweet Stearns), see Stanley (1907) and Burton (1922, 3: 804–810). There is a long obituary on p. 1 of the Detroit *News Tribune* for January 13, 1907, and an editorial tribute on p. 4 the next day.

Stearns personally and whose report on medicinal plants in Michigan was presented in 1877,[332] nor by Volney M. Spalding, who also presented a paper on native medicinal plants of Michigan in 1877, to the annual meeting of the Michigan Pharmaceutical Association where he acknowledged "suggestions kindly given by Ottmar Eberbach, by Mr. Stearns, and Dr. A. B. Lyons." (Spalding's list is essentially unannotated, with at most very general statements of abundance and distribution, but he does acknowledge the work of E. C. Allmendinger and E. Palmer.)

Before leaving Stearns' pioneering compilation on the local flora, it should be noted that he was one of the first three curators (Henry Gillman was another) of the Detroit Scientific Association in 1874. Some specimens collected by him are in the herbarium of that Association (see chapter 7). In 1881 he disposed of his retail drug business; the manufacturing operation was incorporated as Frederick Stearns & Company in 1882 a large and successful pharmaceutical manufacturer in Detroit. Stearns was a world traveler and collector in many fields, including conchology; in 1899 he presented to the University of Michigan an extraordinary collection of musical instruments and in 1901 he was awarded an honorary A.M. degree by the University.

The earliest extensive lists for Michigan not restricted to medicinal plants were, however, restricted largely or entirely to the Lower Peninsula: those of N. H. Winchell (1861) and Nathan Coleman (1874). The first list purporting to cover all of Michigan was a curious 16-page pamphlet published in 1877 by Elmore Palmer (1839–1909),[333] of Dexter, Michigan: "Catalogue of Phaenogamous and Acrogenous Plants Found Growing Wild in the State of Michigan." It is a mere list, with no annotations at all and no statement of its sources except for an acknowledgment of Winchell's catalog of 1861 and a reference to the author's "travels throughout the State." Erwin F. Smith wrote of Palmer's list to Miss E. C. Allmendinger: "Have you seen Dr. Palmer's Catalogue of Mich. Plants? Quite as remarkable for the 'commissions as for the omissions.' The Dr. writes [apparently to Smith] that he is in active correspondence with nearly all the leading botanists in the U.S., and has received letters in regard to his Cat. from every state in the Union except Texas, Georgia, & one other."[334]

Elmore Palmer was born in Albion, Michigan, December 17, 1839, descended from Pilgrim stock who had landed in Massachusetts in 1629. He spent his childhood on a farm, attended what later became Albion College, and began to study the drug business at the age of 14. At 20, he commenced to read medicine in a physician's office and the next year entered the medical department of the University of Michigan. After a year (1861–1862) he entered military service and in December 1862 passed the Board of Medical Examiners and was appointed Medical Cadet, U.S.A. Until December of

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[332]Messrs. Nelson and Baker, founders in 1889 of the firm with which Lyons was later associated, had formerly been in the same business with Stearns, but this could not have inhibited Lyons from citing Stearns in 1877, which was even before Lyons was associated with Parke, Davis (organized in 1867)–yet another of the prominent Detroit pharmaceutical houses. Their contributions to pure botany should some day be written up more fully!

[333]Long accounts about Elmore Palmer are in *Mich. Alumnus* 14: 24–25 (1907) and 16: 143–144 (1909); the file of the Alumni Records Office includes an obituary from a Buffalo newspaper. Palmer was serving as secretary of the class of 1864 at the time of his death and had attended a class reunion in Ann Arbor as recently as 1907. There is said to be an account of his life, with photograph, in *The National Odd Fellow* of February 15, 1896. Palmer was an active Odd Fellow and a 33rd degree Mason.

[334]Letter of August 30, 1877, in Allmendinger papers, University of Michigan Herbarium. Smith at the time was 23, had lived in Michigan for seven years, and had just completed his first year of high school; but he was already a discriminating student of the local flora!

1863 he served at hospitals in Louisville, Kentucky. He then re-entered the University of Michigan and received his M.D. in 1864. He served a year as surgeon with the 29th Michigan Volunteer Infantry until mustered out September 6, 1865. He practiced his profession for 13 years in Dexter, Michigan, and also practiced briefly in Kankakee, Illinois, and in Colorado before moving in 1886 to Buffalo, New York, where he spent the rest of his life, prominent in medical and fraternal affairs. In 1886 he was a charter member of the Western New York Medical Society, which he served as president in 1891. He died in Buffalo October 23, 1909. I have found no evidence of any activities in botany or other branches of natural history except for his Michigan catalog, and can recall seeing no specimens collected by him.

The first work which attempted to supply an annotated list for the whole state of Michigan was Wheeler and Smith's "Michigan Flora," published in 1881 in the report of the State Horticultural Society of Michigan, thanks to endorsements by William J. Beal and his banker friend, Charles W. Garfield, a member of the State Board of Agriculture and active in horticultural circles. The authors gave due credit to their predecessors: to the work of John Wright for Douglass Houghton, to Burt and Whitney and Cooley, to the lists by Winchell and Coleman and Allmendinger and others, to Daniel Clarke and Henry Gillman and E. J. Hill for specimens or unpublished lists; they also paid tribute to several others who had "been connected, more or less, with the botanical interests of the State, either as teachers or collectors," not all of whom it has been possible even to mention in the present account, but including O. B. Wheeler and Rev. D. R. Shoop (as "J. Shaup").

The authors of this pioneering flora were, at the time of its publication, self-made naturalists from Hubbardston, some miles northwest of Lansing. Erwin Frink Smith (1854 1927)[335] moved in 1870 with his parents from near Syracuse, New York, to a farm his father had bought near Hubbardston. He was already interested in botany and other branches of science, and pursued these (as well as other) studies diligently whenever farm chores would permit. Largely self-taught, in 1880 he graduated from high school in Ionia and spent the summer attending the Agricultural College in East Lansing. But he could not afford further study, and became a keeper at the Ionia State Reformatory. From 1882 to 1885 he was employed by the State Board of Health in Lansing and then, having saved enough money for a year at the University of Michigan, he continued his formal education, receiving his B.S. with honors in 1886 after a year of residence. He then began his career with the U.S. Department of Agriculture (doing most of the work for his doctorate, received from Michigan in 1889, in absentia); his fame as a plant pathologist needs no elaboration here.

Soon after moving to Michigan, Smith began his long friendship with Charles F. Wheeler (1842 1910),[336] who was the village druggist, bookseller, and postmaster in Hubbardston. Already recognized as the state's leading "amateur" botanist, Wheeler finally gave himself fully to botany and in 1891 received his bachelor's degree from the Agricultural College, where he remained on the staff until going to the Department of Agriculture in 1902. Like Smith, Wheeler was originally a native of New York state, but he settled in Michigan to regain his health after the Civil War, attending one year

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335Rodgers (1952) has given a full biography of Erwin Frink Smith, including some autobiographical material on his early years in Michigan. A short summary is in Jones (1977, pp. 277–279).

336On Charles Fay Wheeler, see Wight (1910); Beal (1910); Voss & Crow (1976, pp. 5–6 *et passim*).

(1866–67) in the medical department of the University of Michigan. It was natural that the two promising botanists of the Hubbardston area should collaborate as they did. With a deadline for copy the next January, Smith began a letter to Elizabeth Allmendinger May 2, 1880: "Charles & I have begun work on our 'Flora' & we wish you to help us. . . . We wish to make it as complete & reliable as possible. Prof. Beal will help us, & if you & Dr. Lyons will also lend a helping hand, there is no reason why it should not be the best Michigan Flora yet published."[337] Indeed, this first annotated flora for the entire state did receive wide acclaim. It was the first major published work of each of its authors, although each had published short notes on Michigan plants in the *Botanical Gazette* 1878–1880.

In 1892, a new edition of the "Michigan Flora" was published, in which Wheeler collaborated with William J. Beal (1833–1924).[338] Many new names of collectors appear among the acknowledgments. Beal, a native of Lenawee County, Michigan, received his bachelor's and master's degrees from the University of Michigan, where he was a student of Alexander Winchell's. A gifted teacher in the best tradition of Asa Gray and Louis Agassiz, with whom he studied at Harvard, Beal built a strong and practical program in botany at the Agricultural College, where he went in 1870 as professor of botany and where he remained for the rest of his professional life. The Beal Botanic Garden, established in 1873, and the Beal-Darlington Herbarium at what is now Michigan State University are tangible monuments to his labors there for 40 years. Beal and Wheeler collected at many places around the state, and maintained contact with many local collectors.

Beal is too well known and too "modern" to require extended discussion here, as

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337Letter in Allmendinger papers, University of Michigan Herbarium. Quite possibly similar letters were sent by Smith or Wheeler to other correspondents in the state.

338On William James Beal, see Baker & Baker (1925); Voss & Crow (1976, pp. 3–4 *et passim*); Jones (1977, pp. 272–274).

Charles F. Wheeler (1842–1910).

is another great name in the history of the Agricultural College, Liberty Hyde Bailey (1858 1954).[339] A native of South Haven, Michigan, where he collected plants as early as the 1870's, Bailey graduated from the College in 1882. His freshman year, he visited Wheeler and Smith in Hubbardston and he continued to offer them encouragement in their work.[340] After serving as a special assistant to Asa Gray at Harvard, Bailey returned to his alma mater in 1885 as professor of horticulture and landscape gardening a highly effective teacher and lecturer as well as a prolific author. He was also a collector. Among the better known plants of his Michigan days are sets of *Carex* exsiccatae, provided with printed labels headed "North American Carices." These were collected soon after he returned to the College to teach. While he was a student, he had published several short papers, including partial lists of beach and dune plants in the vicinity of South Haven and comments on ranges of plants in Michigan and adjacent areas.[341]

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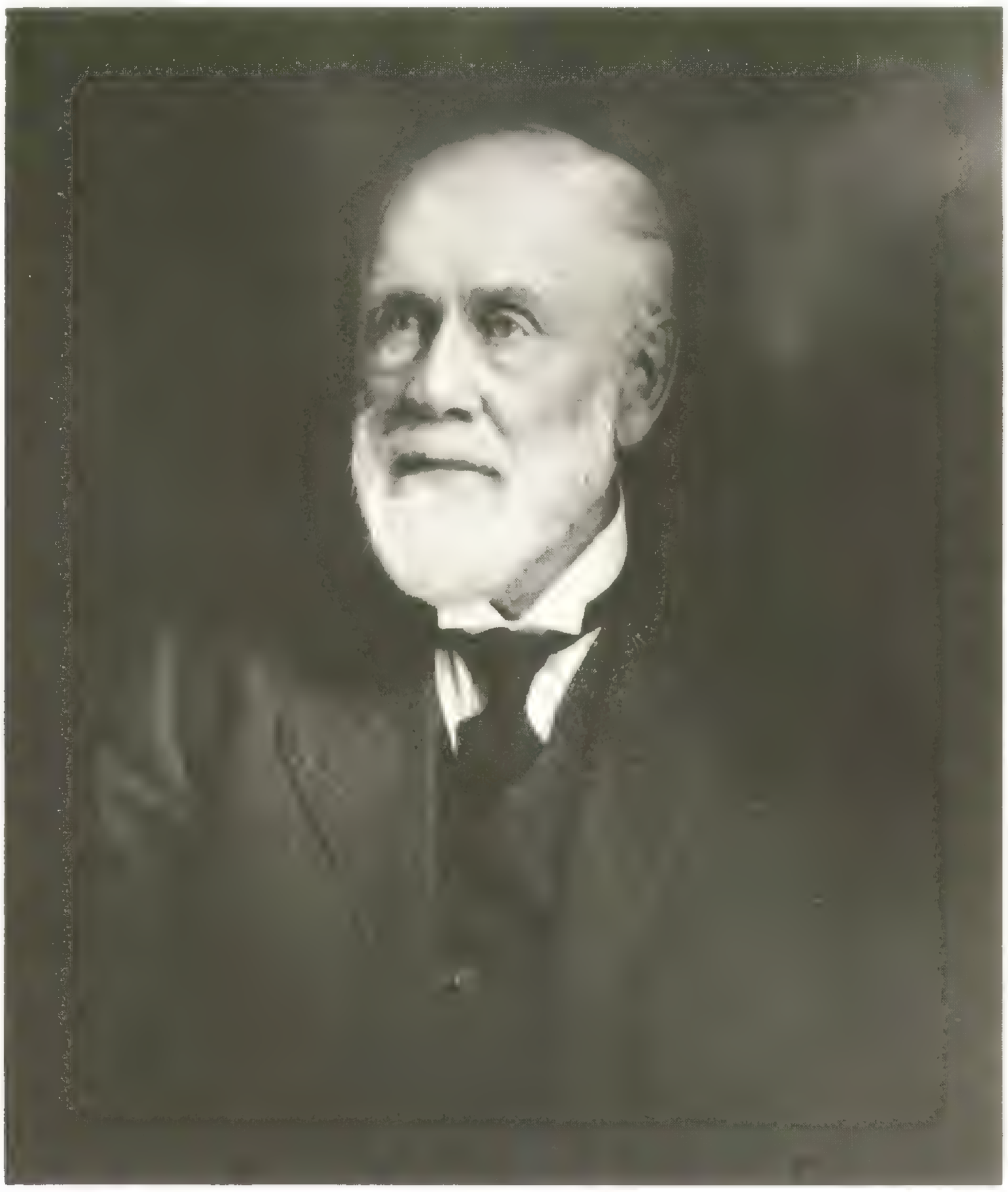
[339]On Liberty Hyde Bailey, see the book-length treatments by Rodgers (1949) and Dorf (1956); among much shorter sketches are those by Lawrence (1955) and Voss & Crow (1976, pp. 4–5 *et passim*).

[340]Rodgers (1949, p. 57).

[341]Bailey (1880a, 1880b, 1882).



William J. Beal (1833–1924), on his 80th birthday.

In 1888 Bailey accepted an offer to go to Cornell University, where his success is legendary. In the same year, he accepted an invitation from Sereno Watson to revise the sedge genus *Carex*—our largest genus of vascular plants in temperate North America—for the forthcoming sixth edition of *Gray's Manual.* In 1888, Bailey and Beal and Wheeler also engaged in another enterprise, in which they were joined by two senior students, Lyster H. Dewey (1865–1944) and Daniel A. Pelton (1865–1926)–an exploring expedition across the northern Lower Peninsula of Michigan.[342] Lumbering was in its heyday at the time; railroads were stretching northward (having first reached the Straits of Mackinac in 1881); stagecoach roads were creeping through the wilderness. A full and detailed account of this expedition having been published in 1976, it is necessary only to stress here that the two-week trip by covered wagon from Harrisville to Frankfort, along sandy roads (some of them brand new), was a productive one for specimens and a major effort to explore the interior of northern Michigan as transportation by means other than boat (or foot) became feasible.

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By the dawn of the 20th century, there were people all over Michigan and adjacent states interested in plants and making collections, both along the shores and in the interior. These included students and schoolteachers, clergymen and lawyers, physicians and bankers, and they often had the encouragement of botanists in the colleges and universities.[343] Beal revised the "Michigan Flora" for the last time in 1904 and noted on the first page of his introduction: "Within the past few years a delightful department of botany has attracted much attention. It is emphatically outdoor work and is known as Ecology . . ." While much remained to be done (and still does) regarding details of the occurrence and distribution of plants in the Great Lakes region, many additional aspects of botany were coming to the fore after nearly a century of initial explorations. It has taken several lines of thought, sometimes tangled or intertwined, for us to survey those explorations and the foundations they laid for the present century. But in pursuing these various directions, the purpose has been to share some of the spirit of the pioneer century for the new science of botany in this portion of the Old Northwest.

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[342]The contemporary newspaper accounts of this expedition, together with information on its personnel, lists of plants, and comments on the itinerary, are given by Voss & Crow (1976).

[343]At least a dozen such institutions which exist to this day were founded in Michigan before 1900 (in fact, before 1890), although, to be sure, some were relatively inactive botanically.

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